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THE
BUREAU OF BIOLOGICAL SURVEY
ITS HISTORY, ACTIVITIES
AND ORGANIZATION

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THE BUREAU OF BIOLOGICAL SURVEY

ITS HISTORY, ACTIVITIES
AND ORGANIZATION

BY
JENKS CAMERON



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FOREWORD

The first essential to efficient administration of any enterprise is full knowledge of its present make-up and operation. Without full and complete information before them, as to existing organization, personnel, plant, and methods of operation and control, neither legislators nor administrators can properly perform their functions.

The greater the work, the more varied the activities engaged in, and the more complex the organization employed, the more imperative becomes the necessity that this information shall be available—and available in such a form that it can readily be utilized.

Of all undertakings, none in the United States, and few, if any, in the world, approach in magnitude, complexity, and importance that of the national government of the United States. As President Taft expressed it in his messages to Congress of January 17, 1912, in referring to the inquiry being made under his direction into the efficiency and economy of the methods of prosecuting public business, the activities of the national government “are almost as varied as those of the entire business world. The operations of the government affect the interest of every person living within the jurisdiction of the United States. Its organization embraces stations and centers of work located in every city and in many local subdivisions of the country. Its gross expenditures amount to billions annually. Including the personnel of the military and naval establishments, more than half a million persons are required to do the work imposed by law upon the executive branch of the government.

“This vast organization has never been studied in detail as one piece of administrative mechanism. Never have the foundations been laid for a thorough consideration of the relations of all of its parts. No comprehensive effort has been made to list its multifarious activities or to group them in such a way as to present a clear picture of what the government is doing. Never has a complete description been given of the agencies through which these activi-

ties are performed. At no time has the attempt been made to study all of these activities and agencies with a view to the assignment of each activity to the agency best fitted for its performance, to the avoidance of duplication of plant and work, to the integration of all administrative agencies of the government, so far as may be practicable, into a unified organization for the most effective and economical dispatch of public business."

To lay the basis for such a comprehensive study of the organization and operations of the national government as President Taft outlined, the Institute for Government Research has undertaken the preparation of a series of monographs, of which the present study is one, giving a detailed description of each of the fifty or more distinct services of the government. These studies are being vigorously prosecuted, and it is hoped that all services of the government will be covered in a comparatively brief space of time. Thereafter, revisions of the monographs will be made from time to time as need arises, to the end that they may, as far as practicable, represent current conditions.

These monographs are all prepared according to a uniform plan. They give: first, the history of the establishment and development of the service; second, its functions, described not in general terms, but by detailing its specific activities; third, its organization for the handling of these activities; fourth, the character of its plant; fifth, a compilation of, or reference to, the laws and regulations governing its operations; sixth, financial statements showing its appropriations, expenditures and other data for a period of years; and finally, a full bibliography of the sources of information, official and private, bearing on the service and its operations.

In the preparation of these monographs the Institute has kept steadily in mind the aim to produce documents that will be of direct value and assistance in the administration of public affairs. To executive officials they offer valuable tools of administration. Through them, such officers can, with a minimum of effort, inform themselves regarding the details, not only of their own services, but of others with whose facilities, activities, and methods it is desirable that they should be familiar. Under present conditions services frequently engage in activities in ignorance of the fact that the work projected has already been done, or is in process of execution by other services. Many cases exist where one service could

make effective use of the organization, plant or results of other services had they knowledge that such facilities were in existence. With the constant shifting of directing personnel that takes place in the administrative branch of the national government, the existence of means by which incoming officials may thus readily secure information regarding their own and other services is a matter of great importance.

To members of Congress the monograph should prove of no less value. At present these officials are called upon to legislate and appropriate money for services concerning whose needs and real problems they can secure but imperfect information. That the possession by each member of a set of monographs such as is here projected, prepared according to a uniform plan, will be a great aid to intelligent legislation and appropriation of funds can hardly be questioned.

To the public, finally, these monographs will give that knowledge of the organization and operations of their government which must be had if an enlightened public opinion is to be brought to bear upon the conduct of governmental affairs.

These studies are wholly descriptive in character. No attempt is made in them to subject the conditions described to criticism, nor to indicate features in respect to which changes might with advantage be made. Upon administrators themselves falls responsibility for making or proposing changes which will result in the improvement of methods of administration. The primary aim of outside agencies should be to emphasize this responsibility and facilitate its fulfillment.

While the monographs thus make no direct recommendations for improvement, they cannot fail greatly to stimulate efforts in that direction. Prepared as they are according to a uniform plan, and setting forth as they do the activities, plant, organization, personnel and laws governing the several services of the government, they will automatically, as it were, reveal, for example, the extent to which work in the same field is being performed by different services, and thus furnish the information that is essential to a consideration of the great question of the better distribution and coördination of activities among the several departments, establishments, and bureaus, and the elimination of duplication of plant, organization and work. Through them it will also be possible to

subject any particular feature of the administrative work of the government to exhaustive study, to determine, for example, what facilities, in the way of laboratories and other plant and equipment, exist for the prosecution of any line of work and where those facilities are located ; or what work is being done in any field of administration or research, such as the promotion, protection and regulations of the maritime interests of the country, the planning and execution of works of an engineering character, or the collection, compilation and publication of statistical data, or what differences of practice prevail in respect to organization, classification, appointment, and promotion of personnel.

To recapitulate, the monographs will serve the double purpose of furnishing an essential tool for efficient legislation, administration and popular control, and of laying the basis for critical and constructive work on the part of those upon whom responsibility for such work primarily rests.

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THE BUREAU OF BIOLOGICAL SURVEY

ITS HISTORY, ACTIVITIES, AND ORGANIZATION

CHAPTER I

HISTORY

Purpose, Origin, and Development. It would not be strictly accurate to refer to the Biological Survey of the Department of Agriculture as the natural history agency of the American government. Nevertheless, such a reference would not be so utterly wide of the mark as to give a distorted idea of its work and purpose. A governmental agency that takes a leading, if not the leading, part in American wild life and game conservation, and in the repression and extermination of predatory and other undesirable species; that studies and investigates the life histories, the habits, the habitats, the ranges and the distribution, the comings and goings, and the economic, recreational, cultural, and other values and significations of all American wild birds and animals; and that, finally, gives to the country the results and the conclusions arising out of its work and study in the form of numerous publications; such an agency may certainly be said to have a natural history relationship hardly to be called distant. The truth, indeed, is that this Bureau, though lacking an absolute monopoly in governmental natural history work by reason of the activities of such bureaus as those of Entomology, Plant Industry, Animal Industry, and Fisheries, the Forest and the National Park Services, and the Geological Survey, can claim to be that unit of the government most nearly possessing such a monopoly.

The Biological Survey has been a bureau since 1905 (Act of March 3, 1905; 33 Stat. L., 861, 877). For nearly a decade prior to that year it had been the Division of Biological Survey, the act

of April 25, 1896 (29 Stat. L., 99, 100, 102), having finally expunged the name of Division of Economic Ornithology and Mammalogy, under which designation it had labored since July 1, 1886. Under that designation it had, on the last-named date, been set up in life on its own by virtue of a paragraph in the act of June 30, 1886 (24 Stat. L., 100, 101), making appropriations for the work of the Department of Agriculture for the fiscal year 1887.

The preceding agricultural appropriation act, that of March 3, 1885 (23 Stat. L., 353, 354), in those of its sections setting aside funds for the work of the then Division of Entomology for the ensuing fiscal year, had carried a new clause making provision for the promotion of "economic ornithology, or the study of the interrelation of birds and agriculture, an investigation of the food,¹ habits, and migration of birds in relation to both insects and plants."

That clause constitutes the original legislative authorization for the beginning of the work out of which have developed the varied activities of the Biological Survey of to-day. It must be regarded as the ultimate directive source of those activities.² True enough, it was the 1886 law that gave the work into the hands of a separate and distinct governmental entity; that made the study of birds and beasts, and their relations to man and to the world in which man lives, an independent study with only its own particular ends in view, rather than a study subsidiary to governmental insect work. That conferring of individual status, however, was such a direct outflow of the earlier act—as will be brought out fully later on—that it must be regarded as a mere enlargement thereof, rather than as a new charter for a new subject of investigation. The 1885 act made biological work an established, continuing, uninterrupted part of the agricultural day's work of the government, instead of the semi-occasional thing it had been theretofore.

The careful reader will have noted in the preceding jotting-down of the statutory milestones that mark the Survey's progress a cer-

¹ The comma between "food" and "habits" in the 1885 law was unquestionably a slip. Food habits is what was meant. Practically all succeeding legislation so expresses it.

² Considered, of course, in connection with, and as derived from, the organic act of the Department of Agriculture (Act of May 15, 1862; 12 Stat. L., 387) authorizing the acquisition and diffusion among the people of the United States of "useful information on subjects connected with agriculture in the most general and comprehensive sense of that word."

tain tendency toward the decennial. The years that loom up, he will have observed, are 1885, 1896, 1905—practically a decade from first to second, and from second to third. It is a curious fact—constituting an excellent post to lean the memory on—that this every-ten-years rule, with one notable exception, and possibly one minor one,³ has been a feature of Biological Survey development from first to last.⁴ Since becoming a bureau in 1905 the Survey has undergone no change in formal status. It is a bureau still. But in 1915-16 and again in 1925 there came to it very large accessions of power, responsibility, and influence that greatly widened the sphere of its activities. Merely to remark this striking periodicity will suffice here. The events coinciding therewith will be examined at the proper time.

The Wild Life Thought of America During the Pioneer Period. The early settlers in America naturally knew next to nothing about the wild life of America, and the first things they learned about it were wrong. Or perhaps it would be better to say that they were, or at least many of them were, right in an immediate sense but wrong in an ultimate one.

Colonial Viewpoint. About the first thing learned about American game was that it was "inexhaustible." The American of the 1600's looked upon the vast flights of pigeons that darkened noon-day and took hours to pass a given point, and told himself that such prodigality of nature could never be exterminated. The like belief was engendered by his contemplation of the seemingly endless flocks of ducks and geese and swans that swept down from Canada in the autumn and back towards Canada in the spring. So, too, when he beheld the green clouds of Carolina

³ The notable exception is 1900, in which year the enactment of a really epochal statute tremendously enlarged the scope of governmental biological work. The minor exception is 1918, but it is hardly worth noticing as an exception, because the expansion that came in that year was a direct outgrowth of the great event that makes the preceding decennial year, 1916, stand out.

⁴ The decennial feature is further emphasized by the fact that the four decades of the Survey's history—1885-1928—constitute two periods of two decades each because of two circumstances. From 1885-1905 the Survey had the status of a division, and emphasized in its work the purely scientific rather than the practical. From 1906 to the present (1928) it has been a bureau and has emphasized the practical rather than the scientific.

parrakeets which—unbelievable as it may sound to-day—used to exist in great numbers in the eastern and central portions of the country, enduring zero winter weather without apparent discomfort, and throwing splotches of tropic brilliance across snowy landscapes.⁵ So, too, of the deer, the buffalo, the wild turkeys, whose roasted breasts he learned to use in lieu of bread, and of other sorts of game we need not enumerate.

Everywhere, in short, there was a wild-life abundance which he labelled inexhaustible, and which was inexhaustible—then. What he did not take into consideration was the fact that inexhaustibility is a very relative thing. He foresaw not at all, or but dimly, the colossal changes that three centuries were to bring about in the ratio between “civilization” and the primitive. He did not see the coming of a day with the status of game, considered as a whole, shifted from a condition of magnificent security to one of extreme precariousness. Nor did he have time for nice speculations as to the future chances of the furred and feathered creatures of the wilderness. Despite its food value there were times when game in its plenitude became a positive nuisance, putting the pioneer face to face with the choice between the total loss of the crops he had planted and tended with heartbreaking toil, and the perpetration of a bit of what the standards of to-day denounce as “ruthless slaughter” or “wanton butchery.”

In a word, it was inevitable that his environment should have bred in the early American settler a fixed idea and a trait. The fixed idea was a conviction that any such thing as the extermination of game was impossible. The trait was a prodigal disregard for not merely game but wild life of all sorts comparable to the solicitude which the boy with a stick in his hands feels for the weeds by the wayside. And both the trait and the idea were transmitted to the early settler's children and to his children's children. And along with them were transmitted the fierce conviction that the free-born American had the right to bear arms, and to “gun” pretty much where, when, and how he pleased.

There was another important conception with regard to wild life that the early American settler formed, in which—in contradistinction to the “inexhaustible” conviction—he was wrong

⁵ See Audubon's Ornithological biography, I, 135 (Edinburgh, 1831).

from the first. Because of hasty generalizations, or conclusions jumped-at on very meagre evidence, or old fables, traditions, and proverbs of the Mother Goose sort to which he had fallen heir, he condemned out of hand as menaces to husbandry several birds and animals which were as a matter of fact menaces to agricultural menaces rather than such menaces themselves. And having condemned them, he proceeded to kill them on sight, as did his children after him.

In doing this he was, all unwittingly, helping to make worse confounded a confusion brought about originally by the white man's coming to America and his subsequent activities there. As to this last statement—a word of explanation.

Civilized Cultivation versus the "Balance of Nature." There had come to an approximate perfection in America, in pre-Columbian times, what has come to be termed a harmony, or a balance, of nature. In a manner of speaking, every force was held into its own particular sphere of influence by the operation of other forces more powerful than itself. It might possess a certain amount of rope, a certain latitude for oscillation, but its limits were pretty definitely fixed.

The irruption of European settlement into this condition of primitive regularity, developed and fixed during the course of unnumbered centuries, could not fail to affect it most profoundly. The extensive cutting away of the forestal covering, the wide clearing from the land of the wild plants sown there by nature, and the introduction in their stead of large areas of cultivated plants of a comparatively small number of species produced a condition—and one that progressively enlarged as settlement spread—that, while it did not destroy nature's harmony, most indubitably threw it out of kelter by making necessary a constant and progressive effort toward stabilization. It caused the abnormal increase, for example, of certain kinds of vegetation-consuming insects to which the new plants set out in fields particularly appealed. It caused a seething-up, likewise, of certain animals, chiefly of the rodent kind, which the conveniently marshaled hoards of food represented by crops in fields and barns, and by the stocks and stores of the towns, stimulated to theretofore unknown levels of reproduction.

It is scarcely necessary to point out that the throwing-out of the "harmony" at one point automatically brought about its throwing-out at others. More insects and small animals meant a flaring-up of activity on the part of birds, other animals, and insect-destroying insects—activity that was repressive in so far as the gobbling-up of the increased food supply was concerned, and reproductive with reference to the enlarged prolificity resulting from enhanced prosperity.

And so *ad infinitum*; or, better, clear around the circle. A throwing-out at one point brought about a throwing-out at all, as nature strove to mend matters at each point in turn. Hence the confusion referred to.

The worse confounding of that confusion resulted from another instance of the early settler learning something about American wild life, but learning it wrong. The learning, for example, that the hawk, the owl, and the skunk were injurious to agriculture was natural under the circumstances, as was the resulting declaration against them of a bucolic holy war. It was destined to take America more than two centuries to just about begin to learn that the sins of these creatures against the farmer were few and far between, and offset a hundred fold by the wholesale destruction of certain real enemies of his which they brought about. As has been hinted heretofore, the original condemnation of these creatures was at least partially due to old superstitions and legends that had come down from the days when the owl was a part of the equipment of demonology and graveyard lore—along with the bug-eating bat—and the hawk was nothing but the symbol of cruel predatoriness—the robber baron of the skies, whose perch upon the wrist of his human prototype of donjon keep and coat of mail was eminently fitting. The skunk was early given a bad name because of the sins of his distant relative, the European pole cat, combined with the unfortunate first impressions produced by his undeniably pungent personality.

And so with other birds and animals—condemnation out of hand on the flimsiest of evidence. A bird, for example, might eat three cherries in a day and three hundred caterpillars injurious to cherry trees. But if caught eating the cherries, it was at once put without the law as a pest that was inexhaustible anyhow. The red fox, likewise, was judged by the occasional hen he made

off with and not by the legion of rats, mice, rabbits, and squirrels he placed beyond the possibility of mischief.

But natural as was this reaction toward wild life under the existing circumstances, it was also exceedingly unfortunate. It is hardly necessary to point out that its effect was to hamper the efforts of nature to re-adjust the throwing-out of her balance that had resulted from the coming to America of the axe and the plow. The passage of time, however, brought about automatically a progressive changing of this haltering and hobbling of nature's efforts. Experience and necessity accumulate unceasingly. They teach slowly but constantly. Although for many years it was imperceptible, a trend away from the thought engendered by the starkly primitive conditions of early colonial days toward that made imperative by the ever-increasing utilization of the resources of a virgin continent, was ceaselessly in motion. It began with the felling of the first American tree, the turning of the first American furrow, the killing of the first American deer. The fact that the real inwardness of that trend was not comprehended in its beginnings, that in its earlier manifestations the immediate was seen rather than the ultimate, does not detract from its realness. Thus as to the beginning of American game legislation. The mark that beginning shot at was immediate convenience. But it was none the less a part of the trending toward ultimate wild life conservation that began when the first man stepped ashore at Jamestown.

Development of Legislation for the Protection of Game. There have been game laws of a sort in America since very early days. In New Netherland in 1629, and in Massachusetts Bay and New Jersey in 1647 and 1678 respectively, there are to be noted utterances regarding hunting privileges, and hunting rights; utterances obviously less concerned with game protection *per se* than with throwing the law's majesty around certain privileged classes of huntsmen. Such efforts at such a day amounted to little more than expenditures of so much pompous wind. They are of a piece with the ukases of the Kings of France forbidding their Canadian subjects running off on their own into the wilderness; in defiance of which the class known as *coureurs de bois* waxed numerous, and ranged from the Rockies to Labrador; from Louisiana to Hudson Bay.

By 1776 game laws had been enacted pretty generally throughout the Colonial area, aiming principally at the protection of the food resource represented by deer; though some concern about wild fowl had taken legislative form in New York and Massachusetts. The deer laws varied from close seasons—in a couple of instances even close terms of years—to the prohibition of such things as the use of hounds, the killing of does, the export and sale of deer skins, hunting with fire at night, and hunting on Sundays; the basis of which last prohibition was probably theological as much as it was conservational. As remarked about the earlier hunting privileges, the enactments doubtless were honored very much more in the breach than in the observance, despite the fact that it was in connection with them that the first feeble attempts were made at the institution of a system of special game-protecting officers. The deer wardens and deer Reeves who, about the mid-eighteenth century, came to be a part of local governmental machinery in parts of New England, constitute one of the earliest American examples of the prohibitory device that does not prohibit one hundred per cent. They represented, all of these early efforts, no general fear on the part of the public at large of an imminent, or even an ultimate, deer extermination. What they did express was a dissatisfaction over those local deer scarcities that had been brought about in all except the remoter and more inaccessible regions by the greedier and more wantonly wasteful elements of the population, and by those endeavoring in one way or another, and principally in the way of trafficking in deer hides, to make deer killing a business. The activities of such gentry began to make it increasingly difficult, and oftentimes impossible, for the well-disposed citizen to secure for himself a haunch of venison by the simple expedient of taking a turn in the neighboring woods. His resulting wrath crystallized into legal prohibitions—prohibitions that he himself regarded with none too reverent an eye when by chance a buck appeared at the edge of the clearing concurrently with the existence of a state of leanness in the larder. The colonial enactments, in short, stood for no violent break with the thought of the first comers from overseas who had gazed spellbound upon the prodigal wild life abundance of the new world. But they did stand for precisely the progress in wild life thought that the running of time and the accumulation of experience and necessity

had, in the natural course of events, brought to pass. They are conservational milestones. As such they are worthy of more than a mere antiquarian interest.

One evidence of the purely pioneer reflection of these early laws lies in this—that after they had been passed they remained the last word in game legislation, one might almost say, until the end of the pioneer period in America was very definitely in sight. That is to say, between the breaking out of the Revolution and the middle of the following century no new or more advanced ideas with respect to game protection were given statutory standing. There was some enlargement, to be sure, of the ideas already evolved. They flowed out over a wider area as the nation grew—followed the flag so to speak. The first national game law was passed in 1832 forbidding hunting of any kind in the Indian Territory by any but Indians.⁶ The close season idea came to be applied to other forms of wild life than deer; moose in Maine, for example, being vouchsafed an annual breathing spell in 1830. The shooting of water fowl in spring was forbidden in Rhode Island in 1846, the law, however, being later repealed. The idea back of the colonial prohibition of wild-fowling in sail boats, or in camouflaged canoes, was enlarged in New York and Virginia in the thirties into the outlawing of swivel blunderbuses and other huge guns designed to kill sleeping wild fowl by the wholesale in the practice of the profession of market-hunting. The new law was openly disregarded in New York for many years; and that the practice aimed at has died hard, is evidenced by the fact that one of these guns was seized by a game warden in Virginia as recently as 1925. An extension of the anti-game-hogging idea which, as we have seen, underlay all these pioneer enactments, appeared, also in the decade of the thirties, in the form of laws in Delaware and New Jersey designed to restrict hunting to residents of the state.

Not strictly a legislative development but, by reason of its stimulative relation to legislation, closely enough allied thereto to merit mention at this point, was the organization in New York, in 1844, of the New York Association for the Protection of Game. This was not the earliest American organization of

⁶ It remained in force till 1907, when Oklahoma was admitted to statehood.

this description. For example, a fowling and fishing association had been organized and incorporated in New Jersey as early as 1813. All of the earlier societies, however, in time passed out of existence. The one formed in New York in 1844 still functions, the oldest game protective association in existence in the United States.

But with the beginning of the second half of the nineteenth century, a very real new era in America set in. In the thirty-five years between 1850 and 1885 the volume of game legislation not only became progressively greater but it also showed a constantly growing trend toward a new theory of protection—a protection aimed at the averting of extermination. By 1880 game laws were on the statute books of forty-eight states or territories. The bulk of these laws, it is true, were of the same general tenor as those that we have just noticed, with significant enlargements of the protective official idea, the idea of the restriction of destructive methods of hunting wild fowl, and that of the prohibition of spring shooting. Even more significant were certain innovations cropping out here and there, such as absolute prohibitions of market hunting, the institution of the principle of rest days for wild fowl, the beginnings of the license requirement idea, statutes establishing bag limits of game birds, and prohibitions of the waste of game, these prohibitions first appearing, it should be carefully noted, in the Far West, in Washington Territory in 1865, and in Wyoming and Colorado in the early seventies. Especial attention is drawn to these anti-waste enactments because they expressed, although possibly unconsciously, the beginnings of the realization that the pioneer era in America was, if not over, visibly approaching that status. The last frontiers had not been conquered, but they had been crossed, and their taming was going forward. And in line with this expression of that realization was the enactment by far-western Idaho in 1864 of the first close season on the buffalo, the animal that had been called “countless,” “innumerable,” “inexhaustible,” etc., in America for so long a time that its very name had almost come to connote infinity. And in the early seventies the about-face that had set in with regard to this idea made its appearance in the national Congress, finally taking shape in the passage of an act to prevent the useless slaughter of buffalo in the territories; an act which fell a victim, however, to the pocket

veto. It was about this same time, in 1872, that the Yellowstone National Park was set aside, with a clause in the establishing act forbidding both game wastage and market hunting.

It is instructive to set over against this realization of the numberment of the pioneer era's days, originating where that realization might well be supposed to be less strong, certain evidences of the ancient conception which appeared but a few years earlier in the older portions of the country. Thus there was a law passed about the passenger pigeon in Massachusetts in 1848, but it was not designed to protect the birds. It brandished the whip of justice at persons who frightened pigeons out of the huge nets set for them by market hunters! At that time the wholesale killing and netting of these birds for market had long been a regular occupation. In the thirties they used to be shipped down the Hudson by the schooner load, and were sold from huge heaps in the New York markets for a cent apiece.

Again, in 1857, an effort made in Ohio to include passenger pigeons in the protective clauses of some pending game legislation failed because the legislative committee in charge thereof felt that the birds needed no protection. "No ordinary destruction," it was declared, "can lessen them or be missed from the myriads that are yearly produced."

At first sight the approbation of waste by regions where its results were beginning to be apparent⁷ and its reprobation by those with many years of pioneer, or near-pioneer, existence ahead of them seems strangely contradictory. It seems less so when one reflects that back of the approbation there was, among other thoughts, the thought of a vast unsettled continent stretching away to the westward. The reprobation, on the other hand, proceeded from a section which knew that the westward stretching was not illimitable.

Extra-legal development of the sort already noted as occurring in New York in 1844 continued to take place steadily though not extensively. The State Fish, Game, and Forest League was organized in New York in 1865. Similar organizations appeared in 1871, 1873, and 1874 in Ohio, New Jersey, and Massachusetts, respectively, the Ohio society later developing into the well-known Cuvier Club.

⁷ The last elk was killed in New York in 1845. The wild turkey disappeared from a large part of the state about the same time. It was only about fifteen years later that the last moose was killed in the Adirondacks.

The Period of Transition. But much more significant of the change in general viewpoint that was setting in about the latter half of the nineteenth century were some occurrences in the very opening years of that period ; some of which were good and others deplorable.

The Beginnings of the Recognition of the Relation of Birds to Agriculture. It was in the year 1850 that there first crystallized into definite enactments the experience and necessity which had been accumulating throughout the years with regard to other birds than game birds. Gradually the realization had taken form and spread that many nongame birds, altogether apart from the beauty and the cheer which their mere presence sheds about a countryside, were desirable neighbors for the farmer by reason of their insectivorous habits. The old attitude of utter indifference as to the welfare of such birds began to give way to one of concern. It was not until 1850, however, that this new feeling became strong enough anywhere to bring about legislative expression. In that year a law was passed in Connecticut protecting "insectivorous birds," and one in New Jersey "to prevent the destruction of small and harmless birds" including the "small owl." In the following year, in Vermont, a much stronger law was enacted protecting "nongame birds" throughout the year, and prohibiting, under penalty, the destruction of their eggs or nests.

It is a melancholy commentary upon the "good intentions" of the human race, to record that in the very year in which the first legal protection was accorded nongame bird life, an excess of zeal for the same ultimate object—the more effectual control of pestiferous worms and insects—was the means of letting loose upon America an avian pest of unexampled proportions. The Hon. Nicholas Pike and certain other gentlemen of Brooklyn, impelled by a belief that the suppression of the geometrid caterpillar would be furthered thereby, imported a number of the birds which have come to be known as English sparrows,⁸ and liberated them in the spring of the following year. These first importations failing to thrive, the sponsors of the idea, who doubtless considered

⁸ Really the European house sparrow (*Passer domesticus*). This bird actually does consume the geometrid caterpillar to some extent as well as certain other insect pests. Unfortunately, its sins in other directions are so multitudinous that great areas thereof are left uncovered by the blanket of its virtues.

Main

themselves pioneers in a most worthy "movement," started a drive for funds, raised two hundred dollars, and tried again in 1853. This time, unfortunately, the plague "took." It has been taking ever since, as we shall have plenty of occasion to relate later on.

Other importations of these birds were made in following years,⁹ and the strength of the belief in the general principle of the importation of foreign species of birds to assist in the control of insect pests is illustrated by the fact that a decade later it received governmental encouragement. In those sections of the sundry civil appropriation act of March 1, 1862 (12 Stat. L., 348, 350), making appropriations for the Patent Office—which then had charge of all governmental activities in furtherance of agriculture—there appears a clause making provision for "the introduction and protection of insectivorous birds." Within a few weeks after the passage of this act the agricultural activities of the government were placed in the charge of an independent establishment by virtue of the passage, on May 15th, of that organic act of the Department of Agriculture to which allusion has been made above.

That the language of this act, ordering the diffusion of agricultural knowledge in the most general and comprehensive sense of that word, was interpreted as including matters concerning birds useful to agriculture was made evident by the inclusion in the first appropriation for the new department¹⁰ of the same insectivorous bird clause which had appeared in the sundry civil act of 1862. But in subsequent appropriation acts the clause was omitted. In fact, more than twenty years were to elapse before any further direct national legislative notice of the relationship between birds and agriculture was to be taken. First-rate evidence of the attention this relationship was commencing to attract, however, is afforded by an authoritative contemporaneous utterance. In 1863 it was declared that

The theory of so many years ago and its truth so clearly demonstrated by the most eminent naturalists and scientific men of the present time, that the Creator carefully and wisely provides laws, and also instruments to enforce them, whereby a beautiful

⁹ At various times, also, attempts have been made to establish divers European song birds in America, without conspicuous success.

¹⁰ Made under the Legislative, executive, and judicial appropriation act of February 25, 1863 (12 Stat. L., 682, 691).

and just equilibrium in the elements and workings of nature is maintained, is scarcely, as yet, felt and recognized in its proper and full value by those most practical and, from the nature of their occupation, the most professional of all naturalists—the farmers. They hardly appreciate properly the fact notwithstanding all that has been written and is being written every day on the subject, that, although numerous elements are created in nature which are continually acting against them and their interests, other elements are provided to operate against the workings of these enemies; and if those that are friendly are not interfered with, they will, to a very great extent, counteract the evil effects of the others.¹¹

Development of Economic Ornithology. In short, an interest in wild life in America, founded solely on economic considerations, had begun to be audible by the first decade of the half-century that was to witness the final passing of pioneer conditions. Some later manifestations of this interest are instructive. Probably the two that are most outstanding are the results of a couple of studies that were given to the world in the early eighties.

The first of these papers was "The Regulative Action of Birds upon Insect Oscillations,"¹² by Professor S. A. Forbes, concerning which a contemporary reviewer remarked

The present paper deals with the last of these questions showing to what extent birds depart from their usual practices when confronted with an uprising of some insect species and how they concentrate for its suppression.¹³

The other paper was the "Economic Relations of Wisconsin Birds," by F. H. King, a careful study which had been begun in 1873 and was designed to classify birds beneficial or injurious to man in economic relations.

The pioneer efforts at bird value investigations through the medium of the determination of food habits by actual examinations of stomach contents had been made in 1858 by Professors J. W. P. Jenks and D. Treadwell, who made some fairly elaborate researches

¹¹ "Mammalogy and Ornithology of New England with Reference to Agricultural Economy," by E. A. Samuels, Boston, in Commissioner of Agriculture, Annual Report, 1863, p. 265 *et seq.*

¹² Illinois State Laboratory of Natural History, Bulletin No. 6, December, 1882, pp. 1-31.

¹³ Nuttall Ornithological Club, Bulletin, VIII, 2, 106 (April, 1883).

into the food habits of robins. Rather curiously, both these scientists began this work in the same year, each in complete ignorance of the activities of the other.

There began in 1873 an unexampled outbreak of the Rocky Mountain locust in the western and southern portions of the country, causing great losses to farmers and stockmen and drawing national attention to the devastational possibilities of insect outbreaks to a theretofore unequalled extent. The plague continuing through the following years, and giving no promise of abatement, Congress felt constrained to take note of it in 1877 by the creation of the United States Entomological Commission.⁴⁴ Three entomologists, one of whom was C. V. Riley, of the Department of Agriculture, were set to work in the problem by the Secretary of the Interior, the Commission being formally attached to the Geological and Geographical Survey of the Territories of that Department. The Commission investigated and reported until 1881, being transferred to the Department of Agriculture in that year;⁴⁵ the work it did being continued by the Division of Entomology of that Department to the extent of publishing its later reports. During the later years of its existence the Commission made some investigations of the so-called cotton worm in addition to its main work on the Rocky Mountain locust.

The work of this commission is of interest because of the fact that the scientists in its personnel took note of the relationship existing between the insects they were observing and the wild life deterrents which nature's balance provided against them. In its very first report, issued in 1877, the Commission devoted a chapter (XII) to the vertebrate enemies of insects, and especially birds. The author of this chapter makes an exception, however, of which the reader should by no means fail to take note. He does not rate the English sparrow as an insect enemy worthy of consideration. Instead he states that this bird is an enemy of grains and fruits

⁴⁴ Sundry civil appropriation act of March 3, 1877 (19 Stat. L., 344, 357), under "Miscellaneous objects."

⁴⁵ Sundry civil appropriation act of June 16, 1880 (21 Stat. L., 259, 276). For the complete legislative history of the Commission, consult also acts: June 20, 1878 (20 Stat. L., 207, 240); March 3, 1879 (20 Stat. L., 377, 397); June 9, 1879 (21 Stat. L., 8); June 21, 1879 (21 Stat. L., 23, 29); June 16, 1880 (21 Stat. L., 238, 246); and March 3, 1881 (21 Stat. L., 381, 383).

rather than of insects, as well as an enemy and persecutor of native birds that are insectivorous. Thus was America beginning to learn, less than a quarter-century after the event, that the \$200 entrusted to Mr. Pike and his friends had turned out a bad investment.

Scientific Nature of This Development. In what has been said about the development of a recognition of the economic relations of birds to agriculture it will have been apparent to the reader that it took place much less among the agriculturists themselves than among scientists, naturalists, and bird lovers. The foundation-laying of this research of such importance to the farmer was neither by the farmer nor of the farmer, but rather for the farmer by those who, whatever he might think about it or whatever may have been their compelling motives, were his genuine friends. This, of course, is speaking broadly. Doubtless, there were genuine, or "dirt," farmers, who recognized in very early times the true relationship between their all-important calling and wild life, and were careful of wild life in consequence. The great development in governmental agricultural investigation that occurred between 1862 and the mid-eighties³⁴ is not to be accounted for by scientific influence alone. The growth of interest in the relationship between wild life and agriculture was part of this development. Pure scientific and naturalistic inquiry accounts for the larger part of it, but not by any means for the whole of it.

Pure scientific interest working along its own lines alone, however, had such a direct, although perhaps an unintentional, influence upon what may be termed the coming to a head of that development that some notice of its own growth and development as related to the main subject must not be omitted.

Scientific notice of the wild life of America had its beginnings at a very early day, in the sixteenth century in fact. Fragmentary notes of the early observers, who were explorers, soldiers, or colonizers before they were naturalists, constitute the only concrete results of these pioneer efforts that have come down to us.

³⁴ See acts: March 3, 1869 (15 Stat. L., 283); August 15, 1876 (19 Stat. L., 143, 167); June 19, 1878 (20 Stat. L., 178, 204); June 20, 1878 (20 Stat. L., 206, 240); June 16, 1880 (21 Stat. L., 292, 295); March 3, 1885 (23 Stat. L., 353, 354); and June 30, 1886 (24 Stat. L., 100). See also Caffey, Brief statutory history of the United States Department of Agriculture, *Case and Comment*, Vol. XXII, Nos. 9 and 10 (February and March, 1916).

It was not until the eighteenth century that any works of importance appeared, Bartram and a number of others producing the beginnings of American wild-life—and especially ornithological—literature during that period. In the following century the works of such men as Wilson, Audubon, and Baird were given to the world. Baird's "Birds of North America" was published in the fifties—the first decade of the fateful half-century already alluded to as the era of the definite passing of the day of the pioneer. It is most significant to note that this book marks the beginning of a great growth of ornithological literature, which was as barometric, from a somewhat different standpoint, of the change that was coming about in America as was the concurrent upsurge of wild-life legislation.

Besides this assembling of knowledge in literature of the more formal sort, there was a parallel development of scientific contribution in the form of reports and journals of the various exploring expeditions of the early part of the nineteenth century. This was added to by important contributions of material gathered in the several surveys for the Pacific railroads. And much more notable additions to the general store are represented by the numerous publications regarding the wild life of the Western country resulting from the activities of the four governmental surveys that preceded the creation of the United States Geological Survey.¹⁷ Other governmental cruises, surveys, and expeditions were productive of considerable material of a like nature.¹⁸

The American Ornithologists' Union. Although learned societies that were general in scope existed in America from comparatively early days, similar organizations of more specialized interests did not begin to become numerous before 1850. Pioneer conditions of society are little conducive to either the formation or the flourishing of such organizations.

¹⁷ "Report on Mammals and Birds" (Hayden Survey Report for 1872); "History of American Bison" (Hayden Survey Report for 1875); "Geographic Distribution of the Mammals" (Bull. U. S. Geol. and Geog. Surv. of Terrs., 1878, IV, No. 2). For a complete list of these publications, see Schmeckebier, "Catalog and Index of the Publications of the Hayden, King Powell, and Wheeler Surveys (Bull. 222, Series G., Misc. 26, U. S. Geol. Survey).

¹⁸ Such as "Birds of Kowak River," in "Report of the Cruise of the Revenue Steamer Corwin in the Arctic Ocean in 1884."

But with the settling-up of the country, the growth in population, wealth, and leisure, and the raising of the level of culture—in short, with the waning of the pioneer era—a specialization came to be increasingly apparent in those cultural and recreational activities for which mankind has not the time when engaged in the conquest of the wilderness. Hobbies and side interests came to find an ever enlarging place in the life of America, breaking up, as time went on, into more numerous and more particularizing groups. Those persons with like interests began to gravitate together into societies devoted to these particulars. Thus, some of those interested in that phase of science having to do with bird life, or ornithology, coalesced into the Nuttall Ornithological Club, in Cambridge, in 1873. This organization was largely, though not entirely, a local one. The need for a similar society with a national scope continued to be felt increasingly with the passage of time; and ten years after the Nuttall Club began, an offshoot of it was formed to that end in New York City under the name of the American Ornithologists' Union. As this organization has developed into the outstanding national ornithological society of America, and because of the very intimate bearing it has had upon both the beginning and the continuance of governmental wild life activities, an account of its formation and the events arising out the same is indispensable to this narrative. It is scarcely too much to say that the governmental unit now known as the Biological Survey came into being when the Union was formed in 1883, so very direct an outgrowth is that unit of the older private organization.¹⁰

The Union was formally organized on September 26, 1883, and its first "Congress" consumed the two days following, the principal part of its work being the formation of three committees upon the subjects of faunal areas, the English sparrow, and bird migration. The object of the first-named committee was the determination of the distribution of each species of North American birds, particularly as regarded their breeding, winter, and migratory ranges. The sparrow committee aimed at the determination of the eligibility or ineligibility of this bird as an adopted member

¹⁰ See the earlier volumes of the Ornithologists' Union's publication, "The Auk," an outgrowth of the "Bulletin of the Nuttall Ornithological Club." The first volume of "The Auk" appeared in 1884.

of the American avian family. The questionnaire method was used for securing information regarding the sparrow's economic relations to agriculture and horticulture. The third committee, upon which especial emphasis was placed, was designed to investigate the migrations of birds in the United States and British North America as fully as possible. To this end a chairman was appointed and empowered to divide the territory to be investigated into districts and appoint a superintendent for each. Thirteen²⁰ districts were created accordingly, and coöperation was sought and secured with the United States Lighthouse Board and the Department of Marine and Fisheries of Canada. Coöperation was also asked of ornithologists, field collectors, sportsmen, and observers of nature, who were asked to report, per questionnaire, upon all ornithological phenomena in their territories, such as arrivals, departures, permanents, transients, etc., as well as upon contemporary and correlative data, meteorological and otherwise.

The response to this appeal for coöperation was something more than instant and emphatic. Literally, it was overwhelming. When the second Congress of the Union assembled in New York the following September (1884), the chairman of the important committee on migration and geographical distribution of North American birds²¹ reported that the volume of incoming information evoked by the activities which the Union had set in motion at its organization a year before was so huge that it would be impossible to continue the work mapped-out, in anything approaching an adequate manner, unless pecuniary aid were secured. From more than a thousand observers in every state and every territory except Nevada, and from Canada, Labrador, and Newfoundland, notes upon bird life as observed from Mexico to Point Barrow and from Cape Race to Lower California were continually pouring in and piling up. Lighthouse keepers from all coastal Canada and the United States were sending in invaluable data. Applications were available from sufficient aspirants to more than double the force of observers. Several hundred newspapers were assisting the movement with generous publicity. In short, the experiment re-

²⁰ Later sixteen.

²¹ This committee was a merger of the two original committees on bird migration and faunal areas.

sulted in giving most impressive proof that the day of the general careless taking of wild life for granted has passed in America forever. Time had run. Experience had accumulated. This was America of the mid-eighties. Had the experiment been attempted in the fifties, humor of the Artemas Ward-Petroleum V. Nasby sort would have made of it a national joke. But the America of the mid-eighties had seen the fate of the buffalo determined with the completion of the Union Pacific in 1868, which event divided the animals into a northern and a southern herd and gave an easy means for the shipment of hides. It had seen the southern herd practically exterminated by 1874, and the northern herd doomed with the completion of the Northern Pacific in 1881. It had seen that protective legislation was impossible to secure so long as the killing by hide hunters was profitable.

Influence of the Union in the Institution of Governmental Wild Life Work. America of the mid-eighties had also seen the practical extermination of the Carolina parakeet and the passenger pigeon, of which latter bird the last great nesting to be recorded took place in Michigan in 1878. As in the case of the buffalo, no serious effort to protect it was made while its abundance continued.

Other things, too, than the extermination or near-extermination of native birds and animals once considered inexhaustible had begun to focus American attention by the mid-eighties upon the vital relation between wild life and national welfare. The case of the rabbit in Australia,²² that of the starling in New Zealand, and, nearer home, that of the English sparrow in America had all given illustration of the danger to nature's balance lurking in ill-considered efforts at improvements on nature's own arrangements. Likewise, the scandalous lengths to which the slaughter of wild life for market was being carried had begun to arouse a not-inconsiderable volume of protest. The time was ripe, in short, for the beginnings of national effort in response to national concern. The final point of accumulation of experience and necessity had been reached. The need which had developed in the work of the new society of bird-lovers was fated to be the grain that tipped the scales.

²² Introduced into Australia in 1850, the same year the Hon. Nicholas and his associates made their first attempt to inoculate America with the sparrow.

When, therefore, it was determined by the Council of the Union to seek the pecuniary aid needed from the nation, by suggesting that the nation make ornithological investigation a part of its regular work in the dissemination of agricultural knowledge, no great difficulty was encountered in securing the adoption of the new idea. The chairman of the Committee on Migration and Distribution, whose report had disclosed the existence of the wide-spread interest outlined above, was instructed to prepare a memorial to Congress advocating the creation of a division of economic ornithology under the Department of Agriculture. Later, through the assistance of the Entomologist of that department, and of Professor Spencer Baird, of the Smithsonian Institution, he secured a hearing before the House Committee on Agriculture. That committee turned down the proposal, but the corresponding committee of the Senate, largely because of the determined efforts of its chairman, Senator Warner Miller of New York, who spoke in its favor before the Senate,²³ gave it favorable consideration. This resulted ultimately in the securing of an appropriation of \$5000 for the beginning of the work in the Agricultural appropriation act of March 3, 1885, to which allusion has already been made. The House, however, would not agree to placing the work under a new division, but insisted upon making it subordinate to the existing Division of Entomology.

The First Two Decades of Governmental Work, 1885 to 1905. Work was formally begun on July 1, 1885, upon which date the initial appropriation became available. Previously, the chairman of the Ornithologists' Union Committee on Migration and distribution was appointed to take charge of it, the Commissioner of Agriculture having requested the Council of the Union to recommend a suitable director, and the Council having responded, at a meeting in Washington on April 21, 1885, by indorsing Dr. C. Hart Merriam, the chairman of its committee on migration and geographical distribution, for the place. That gentleman accordingly took charge at the beginning of the following fiscal year. He had previously chosen as his assistant one of the district superintendents he had appointed in connection with the migration study work which had been begun by the Union two years before.

²³ Cong. Record, 48 Cong. 2 sess., February 20, 1885, pp. 1937-39.

Work at First Mainly Economic. As the reader will have noted hitherto, from the phraseology of that original act of 1885, the investigations provided for included the food habits of birds and their migrations in relation to insects and plants. The migration phase was construed as including also the subject of geographic distribution. The Entomologist of the Department of Agriculture, in his report for 1885,²⁴ declared that the interrelation of birds and insects was a subject he had long desired to make a part of the work of his division; and remarked upon the great advantage the investigation possessed by reason of the coöperation of the Ornithologists' Union, which had already studied migration and distribution for two years, and had got organized a force of about fourteen hundred voluntary observers, many of whom the new Ornithologist of the division, by reason of the leading part he had taken in that organization in his work with the Union, was able to hold for coöperation with the government. Of the new work under the division, the food habits phase was taken care of by the Entomologist, who declared it to be the phase of chief interest to the farmer. The migration and distribution phases were handled by the Ornithologist and his assistant. The latter phases were handled, in general, in the same way they had been begun by the Union; that is, by the mailing of circulars and schedules to the observers in all parts of the country, and the tabulating and recording of the resulting data as received. The food habits work consisted of the examination and tabulation of the contents of bird stomachs, together with observation of birds in the field.

But the interest in the new departure was too great, and the influences behind it too strong, for it to continue long in a subordinate position. Largely through the energetic work of Senator Miller, of New York, as the spokesman of those influences,²⁵ an appropriation of \$10,000 was secured for the work in the next fiscal year, and the scope of the work was enlarged to include the study of mammals, as well as birds, in relation, not only to the two basic interests of the farmer, agriculture and horticulture, but also to the new subject of forestry.²⁶ The work, moreover, was

²⁴ Commissioner of Agriculture, Annual Report, 1885, pp. 12, 210-12.

²⁵ Cong. Record, June 10, 1886, 49 Cong. 1 sess., pp. 5495-99.

²⁶ Work in forestry had been begun by the Department of Agriculture ten years earlier, in 1876. See act of August 15, 1876 (19 Stat. L., 167).

given independent divisional status in charge of the new Division of Economic Ornithology and Mammalogy,²⁷ of which Dr. Merriam became the first Chief on July 1, 1886, just a few months, by the way, after America's first popular organization of bird lovers came into existence.²⁸ The work of the new Division during its first two years was practically a continuation, with the enlarged scope made possible by the 1886 law, of the work done during the one year under the Division of Entomology. That is to say, the food habits phase was stressed, and migration and distribution received secondary consideration. The object of the work was stated by the Commissioner of Agriculture in 1886 to be largely an effort toward educating the farmers about birds and animals affecting their interests so that the destruction of useful species might be prevented. Especial point was given to this educative work at this time by a contemporary circumstance well illustrative of the mistaken ideas that had obsessed agriculture with regard to its ornithological and mammalogical friends and enemies for so many years. The State of Pennsylvania had passed the notorious "Scalp Act" in the preceding year, providing for the payment of bounties on the killing of hawks, owls, weasels, and minks. This law was an exceedingly ill-advised one, because of all these creatures the mink is the only one with a consistently bad record as a poultry stealer. Some \$90,000 was spent to effect a saving of less than \$2000. Over one hundred and twenty-five thousand hawks and owls were destroyed and a great increase in insects and mice, thereby made certain. The monetary loss to the farmers of the state made certain by this increase was very great—certainly up in the hundreds of thousands.

In the work on migration and distribution, however, the Division got off to a flying start, as all the material which had been collected by the observers of the Ornithologists' Union was turned over to the new governmental unit. Many of the Union's observers, too, continued to collect and forward data on their own initiative, which, through the Union's courtesy, were forwarded to

²⁷ Act of June 30, 1886 (24 Stat. L., 100, 101).

²⁸ The original Audubon Society, founded by "Forest and Stream" for the expressed purpose of furthering "the protection of wild birds and their eggs." See *The Auk*, III, 288, April, 1886. The difference between this organization and the Union is perhaps best expressed by saying that it was a society of the laity, primarily, rather than one of scientists.

the Division. In another way, also, work begun by the Union in 1883 was utilized as the basis of a most important investigation that the Division carried through to completion. This was the work on the English sparrow. A report on this bird, preliminary to a later and more complete bulletin, was brought out in the first year of the Division's existence, and the material therefor was derived in large part from the accumulations gathered by the Union's aforementioned sparrow committee.²⁹ The report was decidedly adverse to its subject, the Ornithologist, Dr. Merriam, stating that the sparrow was "a curse of such virulence" as to merit systematic attack and destruction. In connection with this work on the sparrow there is one point which should be borne in mind because of its intimate relation to developments that were to occur in later years. This is the plea made by the Ornithologist, after citing the unfortunate results of certain attempts to improve on nature, of which we have already heard,³⁰ for legislation governing the importation of exotic species.

Considerable attention was devoted during these first two years likewise to the bobolink, which for many years had been a pest in the rice-growing regions of the South, where it was known locally as the "rice bird." Field investigations were also carried on in the Northwest, where the blackbird and gopher had become very destructive.

Shift of Emphasis to Biological Exploration. This early emphasis upon the purely economic relations of birds and mammals to the interests of the farmer, as exemplified by the exercise of their appetites—an emphasis that was inevitable in view of the major argument that had been advanced for governmental aid—was not fated to a lengthy survival. A drift away from the economic point of view to the one that had engrossed the Union when it began work in 1883 became apparent almost from the very first. This Union viewpoint had been, as was but natural, the viewpoint of the man who was interested in science first and agriculture afterwards. The Union had been more interested in exact data upon migration and distribution than in the effect of bird and animal preferences in food upon the business of farming. A leading member of that Union had been placed in charge of the work that the government had undertaken as part of its business of

²⁹ Commissioner of Agriculture, Annual Report, 1886, p. 235 *et seq.*

³⁰ Such as the importation of the rabbit into Australia.

diffusion of "useful information on subjects connected with agriculture." It was a foregone conclusion, therefore, that the scientific idea was bound to resent anything in the nature of a position subsidiary to the economic one, and to struggle for precedence over it. In that struggle it was fated to prevail, to retain leadership over a period of years, and ultimately to slip back to the position originally occupied. The first ten years of the work under governmental auspices, begun in 1886 with the Division of Economic Ornithology and Mammalogy and ended in 1896 with the Division of Biological Survey, was a decade of the steady subordination of the economic to the scientific.

This gradual drifting away from the original purpose of the Division is well illustrated by the language employed in the official reports of the Chief of the Division, as well as of the Secretary²¹ of Agriculture during the period in question. Thus, although the Division had been established as the Division of *Economic* Ornithology and Mammalogy, and no legal warrant for a change in that designation had ever been given, Dr. Merriam during the entire decade used the word "Economic" very sparingly in referring to the title of the Division, and never in referring to his own title. The Secretary used the word from 1886 to 1890. Thereafter, from 1891 to 1896, the word completely disappeared from both reports, and the Division was consistently referred to as the Division of Ornithology and Mammalogy. The appropriation acts for the corresponding period, likewise, tell a similar story. Economic was used in the designations consistently from 1886 to 1889. But from then on to the end, the word was completely dropped from those portions of the acts referring to the work of the Division, although it was at the same time included in those portions making provision for the personnel.

Statements made in the general subject matter of the reports of the Ornithologist²² during this decade are even more significant

²¹ Or the Commissioner. The Agricultural Department became a full executive department in 1889, under the act of February 9, 1889 (25 Stat. L., 659), and its head, formerly a Commissioner, became a Secretary and a member of the President's cabinet.

²² The head of the Division during the decade 1886-1896 was variously referred to as the "Ornithologist," the "Ornithologist and Mammalogist," and the "Chief of the Division," etc. Formal authorization for the use of the latter designation was given in the act of March 2, 1895 (28 Stat. L., 727, 728, 730).

of what was being driven at than this studied ignoring of an unloved word. Thus, in the report for 1888, we find Dr. Merriam making complaint of the smallness of his appropriations and the consequent limitation of his staff, the basis of the complaint being that the Division was being forced, because of this handicap, to be "almost exclusively occupied in the more purely economic phases of the work." The resources provided were not so limited, however, as to prevent the beginning in this same year of an amplification of the work on distribution that the reader is enjoined to note and remember. This was the preparation of colored maps showing the distribution of species throughout the United States in particular, and North America in general.

In the report for 1889 the trail of the new trend becomes more sharply defined. For the first time a definite cleavage is boldly made between the two viewpoints. The work of the Division is described as being divided into two lines: (1) Economic Relations, the study of birds and mammals beneficial or harmful from a direct economic standpoint; and (2) Geographic Distribution of Species, which latter activity was declared to be "equally or even more important." Regarding this claim, the argument was advanced that the mapping of faunal and floral areas in the study of the distribution of species, which was basically, of course, purely naturalistic work, would be of benefit to the farmer by showing him the boundaries of the areas fitted by nature for the growth of certain crops and the support of certain breeds of stock, and *vice versa*. Finally, it was strongly urged that there should be established under the Department of Agriculture a "biological survey," into which the existing Division of Ornithology and Mammalogy (*sic*) should be merged.³³

The cleavage was further emphasized by the beginning of a dual system of publication of the results of the Division's work. Matter that was purely economic and agricultural was to be published in the form of bulletins³⁴ and special reports, or circulars; while

³³ The marked change in emphasis in this year (1889) may have been partly due to the fact that it was the year in which departmental status was attained. A change in national administration likewise occurred in this year.

³⁴ In 1897 a new series of bulletins, known as "Farmers' Bulletins," was instituted. In character of content they are similar to ordinary bulletins in that they stress the economic or the directly agricultural rather than the scientific or naturalistic. They are generally shorter than ordinary bulletins, and, being designed for more general circulation, are prepared in a more popular style.

matter whose immediate appeal was naturalistic or scientific was to be brought out in a continuing series to be known as "North American Fauna." This year is also noteworthy as being the one in which occurred the first actual performance, on anything like an ambitious scale, of the work that lay nearest Dr. Merriam's heart. It consisted of a careful "biological survey" of some five thousand square miles in the region of San Francisco Mountain and the Little Colorado Desert in northern Arizona. It resulted in the definite recognition of seven life zones on the continent of North America, and in the publication of a provisional biogeographic map showing their approximate boundaries.

How well Dr. Merriam succeeded in the advancement of his preferences is clearly illustrated by the wording of the Agricultural appropriation act passed in the following year, July 14, 1890 (26 Stat. L., 282, 283, 285), which departed from the phraseology theretofore employed in making provision for the work of the Division by establishing the investigation of "the geographic distribution of animals and plants" as the field of fields for divisional endeavor. The act also carried a substantial increase in appropriation. Dr. Merriam was justified in asserting in his report for that year that "the division is now in effect a biological survey"; and the official organ of the American Ornithologists' Union had likewise abundant reason for its statement that "the indefatigable chief of the division . . . may be congratulated on having at last realized his hope of establishing in effect a Biological Survey of the United States."³⁵

The ascendancy of the naturalistic idea was indeed now firmly established, and the story of the balance of the decade is for the most part a record of the steady advancement of that idea. In 1891, for the first time, geographic distribution is mentioned first in the official divisional report of work done, and economic relations is retired to second place.³⁶ In all subsequent reports down

³⁵ *The Auk*, VII, 414 (October, 1890).

³⁶ By this it is meant that the order indicated was followed in that preliminary statement of the division of the work into two lines already mentioned as having been made for the first time in the report for 1889. But in the report for that year, and also in that for 1890, geographic distribution, though mentioned last in the preliminary statement, was discussed first in the report proper.

to and including the one for 1906 this order is retained.³⁷ Also, in 1891, the major part of the Division's activities was employed in an extensive biological survey and biogeographic mapping of the Death Valley region of southern California and southern Nevada. A rather elaborate expedition—popularly referred to at the time as the "Death Valley Expedition"—spent from January to September "determining the actual boundaries of the several life zones of the region and studying the problems involved in the laws governing this distribution." During a part of the time the Chief of the Division was in charge.³⁸ Besides divisional personnel, the membership of the survey included representatives of the Entomological and Botanical Divisions of the Department of Agriculture. The Weather Bureau³⁹ was also represented.

In the succeeding years of the decade "biological surveys" of various portions of the Western country constituted by far the greater part of the work of the Division, the economic relations activities consisting almost altogether of the examination and tabulation of bird stomach contents, and coming to be referred to as "laboratory work." New editions of the biogeographic map appeared in 1892 and 1893, that for the latter year including a brief statement of the principal crops adapted to the several life zones. The phrase "ornithological and mammalogical investigations," which had been employed theretofore in the acts making appropriations for the Division's work, was replaced in 1894 by "biological investigations," the first appearance of the word biological in divisional legislation. At the same time additional latitude was accorded this biological investigational work by authorizing the study of the "migrations" of animals and plants as well as of their "geographic distribution"; the wording likewise being made to include birds as well as animals and plants.⁴⁰ The divisional

³⁷ That is to say, geographic distribution retained first place. But long before 1906, the work of the Division had expanded into more than the two original lines.

³⁸ Dr. Merriam was called away from the expedition to serve on the Bering Sea Commission in July, 1891, and continued in that work till 1892. In this way the first contact of the Division with Alaska occurred.

³⁹ This Bureau was transferred to the Department of Agriculture from the War Department, July 1, 1891.

⁴⁰ Compare the phraseology of the appropriation acts of June 30, 1886 (24 Stat. L., 100, 101); July 14, 1890 (26 Stat. L., 282, 283, 285), and August 8, 1894 (28 Stat. L., 264, 265, 267). The study of bird migration

report for the same year announced that the problem of temperature control of the geographic distribution of animals and plants had been solved. In coöperation with the Weather Bureau, temperature data had been platted on the biogeographic maps and had been found to conform with a striking degree of exactness to the boundaries of the ascertained life zones.⁴¹ All of which paved the way for the declaration by the Secretary in the following year, that

The name of this Division is unfortunate, as it conveys an erroneous idea of the nature of its work. The division . . . is in effect a biological survey, and should be so named, for its principal occupation is the preparation of large scale maps of North America, showing the boundaries of the different faunas and floras, or life areas.⁴²

That declaration in turn paved the way for the passage of the act of April 25, 1896 (29 Stat. L., 99, 100, 102), in which appropriations were made for the work of the "Division of Biological Survey" for the fiscal year 1897, and for the remuneration, for the same period, of officers who had previously been known as ornithologists, or mammalogists, but who were now to be referred to as biologists. In discussing that important bit of legislation in his report for that year, the Secretary, after referring to the congressional authorization of 1890 for the beginning of the work in geographic distribution, declared that

and distribution had of course been authorized from the first, but when "geographic distribution" studies were first authorized, in 1890, the wording only mentioned "animals and plants," birds being understood. The 1894 act simply made this point specific.

⁴¹ Announcement of this discovery was first made by Dr. Merriam in an address before the Philosophical Society of Washington, May 26, 1894. A more extended announcement was made in an address to the National Geographic Society, December 14, 1894. Briefly, the principle announced was that animals and plants are restricted in northward distribution by the total quantity of heat during the season of growth and reproduction, and in southward distribution by the mean temperature of a brief period covering the hottest part of the year. Cf. *National Geographic Magazine*, VI, 229-38. See also "Geographic Distribution of Animals and Plants in North America," by C. Hart Merriam, Department of Agriculture, Yearbook, 1894, p. 203.

⁴² Department of Agriculture, Annual Report, 1890, p. 47.

The investigation so authorized has been carried on up to the present time and has been made the more important of the two lines of inquiry conducted by the Division.⁴³

And in speaking of the final casting-overboard of the former name of the Division authorized by the law just referred to he said :

It is believed that this change of name being a recognition of a broad principle heretofore hidden under a designation implying details will add dignity to the investigation and to the Department and will materially aid in enabling the Division to carry on a comprehensive study of the distribution of life in America with reference to the adaptability of the various parts of our domain to different agricultural and horticultural products—not only those now cultivated in this country but also those which from their importance in other lands are likely to prove of value if introduced on fit soils and in their proper life zones—and it should be remembered that we include in our territory all of the life zones from the tropical to the Arctic.⁴⁴

The triumph of biological exploration was now complete, in name as well as in fact.⁴⁵ It was to retain the position of prime importance for a full decade. Meanwhile influences were gradually to develop, before the pressure of which the original objects of governmental wild life work were again to come to the fore. Before exploring to the end this period of the preëminence of geographic distribution, some notice must be taken of the work done by the Division during the period just examined apart from the major interest of the mapping of the life zones. For the most part, this was work in economic relations, as has already been indicated, consisting principally of the examination and tabulation of the contents of birds' stomachs sent in by naturalists, sportsmen, lighthouse keepers, and other coöperators from all parts of the country, or obtained by divisional observers in the

⁴³ This was a much more modest statement than one which had been made by the Assistant Secretary four years earlier (*Ibid.*, 1892, p. 77) in which geographic distribution was declared to be "the most important single inquiry . . . the most far-reaching and the most likely to produce permanent results . . . that is now being carried on in the Department."

⁴⁴ Department of Agriculture, Annual Report, 1896, p. 24.

⁴⁵ So much so as to cause, in the 1897 report (pp. 19, 20) reminiscing of the time "years ago when the Biological Survey was but an incidental feature of the investigations intrusted to the Division of Ornithology and Mammalogy."

field. From the data thus secured it was possible to draw conclusions as to the comparative benefit or harmfulness of various species of birds of a much more accurate nature than could be obtained by field observation alone. The stomach collection of the Division grew steadily. It numbered 10,716 in 1889, and had increased by 1896 to over twenty-five thousand. To facilitate the work of examination the creation of a carpological collection, consisting of seeds, pits, berries, etc., was begun by the Division in 1888. Especial emphasis was laid in these earlier determinations upon certain species more prominently in the agricultural eye, such as hawks, owls, crows, etc.⁴⁶

Besides this work of food determination, the Division was called upon to perform, in yearly increasing volume, much work in the identification of birds and mammals from heads, wings, etc., sent in for that purpose by various interested persons—including officers in charge of bounty payment administration in several of the states. Efforts to suppress undesirable species of birds and mammals by this ill-advised method were being made rather extensively at the time. The identification work was performed by the section in charge of geographic distribution, as was also the work in bird migration. Most of this latter work consisted of the digesting and tabulating of the data received each year from the force of voluntary observers that the Division had inherited, in part at least, from the American Ornithologists' Union.

The results of the work in economic relations during this first decade were made available to the public in a number of bulletins and reports, some of which were of noteworthy caliber. This characterization applies especially to the bulletins on "Bird Migration in the Mississippi Valley" and "The English Sparrow in America."⁴⁷ The first of these bulletins was very effective in stimulating popular interest in ornithology. Of the second it was stated at the time that it was "the most important treatise ever published upon the economic relations of any bird." This bulletin is also noteworthy as the first of the series of non-technical papers brought out after it had been determined, in 1889, to publish the results of

⁴⁶ In the Yearbooks for 1894 and 1895 the results of this work regarding hawks and owls, and the conclusions derivable therefrom, were published for the benefit of the farmer.

⁴⁷ An amplification of the earlier special report made in 1886. It appeared in 1889; the bird migration bulletin a year earlier.

the Division's work in two district series of papers. Other bulletins were published on hawks and owls, gophers, crows, etc., and special reports upon a variety of subjects, among others one dealing with the matter of "Introduced Pheasants."⁴⁸

Concurrently with these publications upon the economic phases of the Division's work, there appeared from time to time numbers of the purely scientific bulletins in the series known as "North American Fauna." The first two numbers were brought out in October, 1889, and related to mammals only.⁴⁹ The third number appeared in the following August and contained, besides two papers on birds, a general preliminary discussion of the life zones of North America incidental to a later special report on the first "biological survey" in the San Francisco Mountain region in the previous year. By 1896, twelve numbers of this series had been published.

Conclusion of Biological Exploration's Period of Preëminence. For exactly ten years, or from July 1, 1896, the day the Division of Biological Survey came into being, to July 1, 1906, the day the Bureau of Biological Survey was one year old, the biological exploration of North America, or the determination of the geographic distribution of species in that area, remained, nominally at least, the outstanding phase of governmental wild-life work. For the greater part of that time it did so actually as well. But as has been hinted heretofore and as will be brought out fully later on, influences were developing during that decade making inexorably for a change of emphasis. When the annual report of the Bureau for the fiscal year 1907 gave to the subject of economic relations that precedence in discussion which it has ever since maintained, and relegated geographic distribution to the subordinate position it still occupies, it was but giving expression to the operation of forces so powerful that their withstanding was impossible, no matter how strong the desire might be to keep in the background the "more purely economic phases of the work."

But that even that desire was much less strong than it had been, is sufficiently attested. The following example will illustrate.

⁴⁸ Ornithologist and Mammalogist, Annual Report, 1888, p. 484 *et seq.* The report in question concerns the importation into Oregon and Washington in the early eighties of a number of varieties of Chinese and Mongolian pheasants.

⁴⁹ No. 1 was "Revision of North American Pocket Mice"; No. 2, "Descriptions of 14 new species and 1 new genus."

"With a view to rendering the results of previous studies on geographic distribution immediately available for practical agriculture,"⁵⁰ a noteworthy amplification in the map-making took place in the opening years of this decade. Under the direction of an expert scientific agriculturist,⁵¹ the Survey undertook a study of the cereals to ascertain where the various grains thrive with reference to the already mapped life zones. The results obtained demonstrated that profitable cultivation of most varieties of cereals was restricted to two, and in some cases to one, of the life zones; and that the areas of cultivation of particular varieties conformed approximately to the boundaries of natural life zones.

The data obtained in this study were platted on a new biogeographic map based on the latest field work. This, of course, created an opportunity for explaining more fully to the public just what mapping the life zones had to do with practical agriculture. This was done by means of a special bulletin on "Life Zones and Crop Zones of the United States,"⁵² one part of which dealt with the "Relation of the Biological Survey to Agriculture"; the other, to "Laws of Temperature Control of the Geographic Distribution of Animals and Plants."

No argument is needed to demonstrate that work of this sort was tending to make of geographic distribution, if not a "purely economic phase," certainly one approaching that classification. Commenting upon it in an article in the Yearbook for 1897 declared that

The colored maps prepared by the Biological Survey furnish the first rational basis the American farmer and fruit grower has ever had for the intelligent distribution of seeds, and the only reliable guide he can find in ascertaining beforehand what crops and fruits are likely to prove successful on his own farm, wherever it may be located.⁵³

And a few years later the statement was made that

The Biological Survey is engaged in mapping the boundaries of the natural crop belts of the country and aims to furnish the

⁵⁰ Department of Agriculture, Annual Report, 1897, p. 16.

⁵¹ Prof. C. S. Plumb, Director of the Indiana Agricultural Experiment Station.

⁵² Published in 1898 as Bulletin No. 10. See also Bulletin No. 11, "The Geographic Distribution of Cereals in North America," published the same year.

⁵³ Yearbook, 1897, p. 19.

American farmer with lists of agricultural products which, so far as climatic conditions go, are likely to be a commercial success in different parts of the country. This work is based on the theory, the correctness of which is believed to have been established by the Biological Survey, that the boundaries set by nature to areas inhabited by particular kinds of native animals and plants are likewise the boundaries of areas in which particular agricultural crops may be most successfully cultivated.⁶⁴

And the "primary purpose" of the work in geographic distribution was alleged, in 1904, to be "showing the farmer what crops are likely to prove a commercial success in his locality." All of which would seem to indicate that the passage of time had somewhat mellowed the harsh aspects of the purely practical or economic. What had been decried and deplored in 1888 had come by 1904 to be proudly proclaimed.

Apart from this new tinge of practicality the regular biogeographic map work was steadily pushed throughout the decade. The work was done to some extent throughout the country as a whole, but the larger part of it was done in certain sections of the West and Southwest; partly because of their great agricultural importance; partly because the complexity of the work in those sections rendered its completion advisable before the mapping of simpler areas was undertaken elsewhere. This comment applies particularly to California, where from the very beginning a large part of the mapping had been done. This because it had been felt that California had special claims upon the services of the Survey by reason of the immense diversity and value of its agricultural products—ranging all the way from the date, the olive, and the vine to the hardier cereals. But the completion of the zone lines in this region was soon found to be a job as difficult as it was desirable. A range of climatic and topographical diversification embracing practically everything from polar cold to Saharan heat, and from alpine elevations to depressions below the level of the sea cannot be mapped biogeographically in record time. A biological survey of such a region can take nothing for granted. Where each valley and each slope has a climatic individuality, and a corresponding fitness or capacity for particular crops, the putting down upon paper of the life and crop zone lines with even an

⁶⁴ Department of Agriculture, Annual Report, 1901, p. cviii.

approximation of accuracy is not the simplest thing imaginable. In parts of California distances of a mile or less sometimes bring complete changes in fauna and flora. In the lowlands striking differences in the plants and animals are often noticeable in similar latitudes and altitudes, because some are swathed in fog and others perpetually sun-baked. In the mountains, likewise, conspicuous differences are noticeable oftentimes on opposite sides of the same hill, because the angles of the slopes with reference to the position of the sun create conditions productive of different forms of plants and animal life. Because of this veritable maze of difficulties the biological survey of California has constituted, to say the least, a major problem. It has been found necessary in the prosecution of the work to cover the state with a perfect network of lines before the complicated zone boundaries could be established with any degree of exactness. The work in California was carried on throughout the decade. In 1899 a party, under the direction of the Chief of the Division, made a survey of the region around Mount Shasta. The results of the expedition were afterwards published as "North American Fauna, No. 16."

Besides the survey work within the continental borders of the country this decade also witnessed an extension of the work without them—to Alaska, Mexico, and Canada. The Alaska surveys, which began in 1899 and continued throughout the decade without intermission, were one of the results of the immense interest in the northern territory which resulted from the gold rush thither in 1898. Mr. Edward H. Harriman, of New York, organized and financed an elaborate scientific expedition to the territory in the summer of 1899, and the Survey participated in it by request. In the same summer a purely Survey expedition made a reconnaissance survey of the Yukon River from head to mouth.⁵⁵ In the following summer an extension of Mr. Harriman's liberality made possible the furtherance of the work begun by the Survey members of his expedition the preceding year. In succeeding years of the decade surveys were made among the Alaskan spurs of the Rocky Mountains, about the upper and middle Yukon, about the base of the Alaskan peninsula, and among some of the southeastern Alaskan islands.

⁵⁵ See North American Fauna, No. 19, "Report of a Biological Reconnaissance of the Yukon River Region."

In 1900 the operations of the Survey were extended to Canada, and the work there was continued uninterruptedly for six years, during which time extensive surveys were made of the Great Bear and Great Slave Lake regions, the country about the lower Mackenzie River and the Barren Grounds. A representative of the Survey wintered at Fort Simpson, a Hudson Bay⁵⁶ post on the Mackenzie, during the winter of 1904-1905 for the purpose of observing conditions during an Arctic winter and during the early spring before the opening of communication with the outside world. The primary objects of the work in Canada were to throw new light upon the species occupying the border region between Canada and the United States, and to "fit in" with the surveys proceeding concurrently in Alaska. The knowledge adduced by these surveys and by certain others made concurrently in contiguous regions by private enterprise⁵⁷ made it possible for the first time "to discuss with some confidence"⁵⁸ the relations and distribution of plants and animals of the boreal types of the far north.

For a largely similar reason, the study of the distribution of species common to the southern United States and northern Mexico, surveys were made upon a number of occasions during the decade in several of the states of Mexico, including Yucatan.

Besides the basic field explorations and the map-making, which, taken together, constituted the work in geographic distribution, the section charged with that work performed during the decade the usual work in bird migration studies in coöperation with the corps of voluntary observers. It also continued the work of identifying specimens of birds and animals sent in by colleges and museums throughout the country, by various public officers, and by other interested persons.

As has been stated, the Division was enlarged into the Bureau of Biological Survey on July 1, 1905, by virtue of the act of March 3, 1905 (33 Stat. L., 861, 877). In the annual report of the Bureau for the following fiscal year, 1907, the work in economic relations resumed its original status as the activity of outstanding importance.

⁵⁶ During the entire progress of this Canadian work the Hudson Bay Company furnished the most generous and cordial coöperation.

⁵⁷ Private surveys were made at this time in parts of Alaska, Labrador, and the Rocky Mountain region of Yukon territory. The last two were financed by Mr. Charles Sheldon, of New York.

⁵⁸ Department of Agriculture, Annual Report, 1903, p. 485.

Economic Law Makes Economic Relations Paramount. The writer will present chronologically at this point certain occurrences in the latter part of the decade we have just been considering which illustrate graphically the trend away from the purely scientific back toward the practical, which finally brought about the formal change in emphasis to which allusion has just been made. First of all, in the hearings before the House Committee on Agriculture, on February 7, 1906, with regard to the appropriations for the work of the Bureau for the fiscal year 1907, there is apparent a definite note of dissatisfaction concerning the work then being stressed, Chairman Wadsworth declaring that a disproportionate amount of work was being done on the Pacific Coast.⁵⁹

By the following year this congressional skepticism had become much more pronounced and outspoken. Another committee of the House of Representatives held hearings on expenditures in the Department of Agriculture in January, 1907, during the course of which Dr. Merriam was rather more than mildly heckled. Under the heading "Geographic Distribution" in the report of that committee, published March 1, 1907, it is stated that

A great deal of the work being done by the Department of Agriculture is thoroughly scientific and expert in its character, and it is extremely difficult for a layman unfamiliar with the subjects under investigation and the science relating thereto to form an intelligent and adequate opinion of the utility and value of the researches and investigations involved. It is not our purpose to discuss that phase of the work of the Department to any extent but we will give from the examination of the Biological Survey an illustration of the intricate and perplexing character of the investigations to the non-scientific mind.⁶⁰

There then follows a quotation of some two pages of the above-mentioned hearings⁶¹ covering a colloquy between Dr. Merriam and Chairman Littlefield of the committee in which the chairman had made a rather aggressive attempt to pin down the Doctor as to just how the mapping of the various areas of the country inhabited by skunks could be of any practical benefit to agri-

⁵⁹ House Hearings on Agricultural appropriation bill for 1907, p. 416. The work on the Pacific Coast was almost exclusively work in geographic distribution.

⁶⁰ 59 Cong. 2 sess., H. rep. 8147, pp. 38, 39.

⁶¹ Pp. 608-10.

culture.⁶² Commenting upon the evidence adduced in this conversation the report goes on to say that

While we understand the significance that may on general principles be inherent in this odorous representative of the animal kingdom we feel bound to concede that we are still uninformed as to his importance as a potential factor in producing results sought to be accomplished by the application of geographic distribution to and for the country at large.

Four days after the publication of this report there was passed the Agricultural appropriation act for the following fiscal year.⁶³ In those of its clauses providing for the work of the Survey it was an exact duplicate of the same act for the preceding year, save that it included an additional clause directing the Secretary of Agriculture to inform Congress if the work of the Survey was duplicated by any other governmental department,⁶⁴ and to explain its "practical value to the agricultural interests of the country."

The information thus demanded was forthcoming in the following December in the shape of a comprehensive and interesting report illustrated with maps showing the distribution of some of the more injurious mammals.⁶⁵ It featured the work in economic relations as the most important work of the Bureau, but it likewise declared that geographic distribution was an indispensable groundwork to every other activity that the Bureau performed, stating that

The study of the distribution and abundance of animal and plant life is not . . . dependent upon . . . economic investigations; but . . . it is the fundamental basis upon which their effectiveness rests. Without accurate and comprehensive knowledge of the various species, of the areas they inhabit, and of their relative abundance . . . satisfactory economic studies of birds and mammals would be impossible.

⁶² This discussion was probably started by the fact that work was being done at the time on No. 26 of the North American Fauna series, "Revision of the Skunks of the Genus *Spilogale*."

⁶³ Act of March 4, 1907 (34 Stat. L., 1256, 1274).

⁶⁴ There had been some complaint that the Bureau was duplicating work done by the Department of Agriculture in the Bureaus of Soils and Plant Industry.

⁶⁵ 60 Cong., S. doc. 132.

And earlier in the same year,⁶⁶ that annual report of the Bureau before alluded to, in which geographic distribution had first been ranked below economic relations, had referred to the former as the "pioneer work" for "laying the foundations for the more strictly economic investigations to follow"; stating at the same time that it had "naturally decreased in amount year by year until comparatively little now remains to be done." Furthermore, it was declared that the field investigators in geographic distribution did not confine themselves to that phase alone, but collected, as they went along, as much information as possible relative to the habits of mammals and birds in relation to agriculture and forestry. Sometimes they even made special investigations of a purely economic character.⁶⁷

Finally, in a popular magazine article about the work of the Survey, written by a Survey officer, and published within a few weeks of the close of the year in which the events last narrated had taken place, it was declared that

The pursuit of science solely for its own sake, however commendable it may be, is not the spirit that animates our government in its support of scientific research. In its aims and ambitions this is a practical age.⁶⁸

In the same month in which this article was published something in the nature of a parting shot for geographic distribution was fired by Dr. Merriam in a spirited defense of zone mapping that he made before the House Agricultural Committee. He denied emphatically any duplication of work done by other bureaus, and, in the course of describing the finished and unfinished projects in economic relations and geographic distribution, he said:

In this connection I would like to say, for we have been accused of making technical studies, that we could not do satisfactory work in our other lines without a foundation based on these technical studies.⁶⁹

⁶⁶ August, 1907.

⁶⁷ A fact that will become apparent later on.

⁶⁸ "The Policemen of the Air, An Account of the Biological Survey of the Department of Agriculture," by H. W. Henshaw, *National Geographic Magazine*, February, 1908, pp. 79-118. Mr. Henshaw later became Chief of the Bureau, succeeding Dr. Merriam in 1910.

⁶⁹ House Hearings on Agricultural appropriation bill for 1909. 60 Cong. 1 sess., pp. 548, 558, 559.

Now of course it will have been apparent that all of these circumstances just detailed were merely surface indications significant of a deeper undercurrent. Just what that undercurrent was, the sentence last quoted makes plain. The demand of the nation was for less pure science and more pure results; first in the protection of crops, flocks, and herds against insect, bird, and animal enemies; second, in the conservation of the game resources which America had at last come to recognize were by no means "inexhaustible." In a word, it was a matter of dollars and cents, a "business proposition," if you will. It was not that science for its own sake was particularly decried, or that recognition was lacking for the very real practical benefit to agriculture that the work in biological exploration had unquestionably produced. Simply it was the fact that the agricultural and wild-life experience of the nation had been such, and the corresponding necessity of the nation was such, that more practicality had become imperative; and that at points nearer to the heart of the problem than geographic distribution. Broadly speaking the entire history of the Survey from the time it became a bureau down to the present day, is a history of the growth of such practicality along two main lines: First, the repression of undesirable and injurious wild life; second, the protection and encouragement of wild life in its desirable and beneficial forms. There are other lines to the story, but these are the principal ones, to which all the others are, in one way or another, subordinately connected. The balance of this chapter will conform in the main to those two lines. But before proceeding to their development a word should be said about the undercurrent just alluded to as the force that thrust practicality to the fore in the work of the Bureau. Basically that undercurrent was purely economic. It was the inevitable reaction of the nation to wild life and insect assaults upon its food supply. Agriculture was growing amazingly and the value of its products was increasing correspondingly. Unfortunately, wolves, coyotes, rodents of a wide range of varieties, boll weevils, and similar friends of the farmer so rose up *en masse* to claim a share of his product that agricultural prosperity was often more apparent than real. Very naturally the farmer complained. Very naturally he began to demand that the government do something more definite and drastic about the matter than draw maps for him telling him where his animal and

insect friends existed. This knowledge he had frequently acquired elsewhere—in the school of bitter experience.

Thus it was that in the years prior to the attainment of bureau status a progressive trend toward the practical came to be noticeable, evidencing itself in such things as an increased interest in and demand for information upon economic ornithology which devoured eagerly everything the Division had published upon the subject, and demanded more.⁷⁰ The Division's pamphlet on "Some Common Birds in Their Relation to Agriculture,"⁷¹ first brought out in 1897, went through nine editions by 1900 and about two hundred thousand copies were distributed. By 1904 the Division had come to believe "that it is impossible to place too high a value on an accurate knowledge of the food of our native birds," a thing which, it will be recalled, had been regarded as a merely "economic phase" some twenty years before. And by the following year the chorus of agricultural complaint about the toll being taken by predatory and noxious animals throughout the country had become so loud as to bring about the formation in the Division of a new section concerned solely with the economic relations of mammals to agriculture, as distinct from those of birds.⁷²

That part of the undercurrent having to do with game was also mainly economic; but it was likewise affected by the point of view

⁷⁰ A demand met by an article in the 1899 Yearbook—"Review of Economic Ornithology in the United States," by T. S. Palmer.

⁷¹ This was Farmers' Bulletin No. 54 and was the first Survey publication to be called a Farmers' Bulletin. The first use of the term for a designation of any publication of the Department of Agriculture occurred in June, 1889, when Farmers' Bulletin No. 1, a publication of the Office of Experiment Stations, appeared. It is interesting to note, however, that Dr. Merriam, in his letter to the Secretary transmitting his annual report in 1889, declared that "early in the year" he had decided to publish the results of his division's investigations in "two distinct series of papers, namely, (1) farmers' bulletins; (2) faunal bulletins." Why, after making this announcement, seven years should have been allowed to elapse before a survey publication was formally called a farmers' bulletin, while 53 farmers' bulletins were being published meanwhile by other units of the Department, is not quite clear. After its use in the letter cited above the term "faunal bulletin" was never employed to describe the numbers of the North American Fauna series. See announcement at head of No. 1 of that series.

⁷² The two sections were merged in the following year into the one section of economic relations of birds and mammals, but the change denoted an administrative adjustment incident to the general reorganization following the attainment of bureau status. It was in no sense a retrogression.

of the sportsman, the nature lover, and the æsthetic conservationist. It was the protest of these elements, alarmed at the rapid and progressive disappearance of game as a result of market hunting and unregulated shooting, rather than the protest of the farmer, that helped bring about in 1900 the enactment of a—for America—very advanced piece of legislation, to which full consideration will be given at another place.

The Twenty Years as a Bureau, 1906 to 1928.⁷³ Although the greater part of the economic relations work performed by the Division of Economic Ornithology and Mammalogy, and later by the Division of Biological Survey, had to do with birds, animals were not entirely neglected.

*Warfare Against Predatory and Noxious Animals.*⁷⁴ In the very first divisional report after the separation from the Division of Entomology in 1886, Dr. Merriam had much to say about certain rodents, more especially gophers, ground squirrels, and meadow mice, the ravages of which were occasioning considerable loss to the agricultural interests of the country, particularly in the West. In connection with his observations about these animals he drew attention to the great damage which similar animals had wrought in other lands, especially in Australia and New Zealand, and he emphasized this point with a long quotation from a report made by the American Consul-General in Melbourne concerning the disastrous results of the introduction into the Antipodes of the English rabbit; an ill-starred attempt to improve upon nature which had been made at just about the same time the English sparrow was let loose in America. In these somewhat extended remarks about mammals, however, he was actuated less by a desire to engage the activities of the new division in any extensive program of work in economic mammalogy than by a wish to emphasize the need, as he saw it, for the enactment of a bit of protective

⁷³ This title denotes an approximation rather than an exact period. Under it some events occurring before the attainment of bureau status have been dealt with. The writer has adopted this method for convenience of treatment and because he believes that it makes for a clearer understanding on the part of the reader of the real major events of the bureau period, which events constitute the real reason for this portion of the work.

⁷⁴ As used herein, the expressions "predatory animals" and "noxious animals" refer respectively to animals that prey upon domestic stock and wild game, and to animals that consume crops and stocks of foodstuffs.

legislation which was not destined to attain consummation for about fifteen years—as a part of the important legislation passed in 1900 to which reference has just been made.

Nevertheless, some of the first investigations made after the beginning of independent divisional work in 1886 were in connection, as the reader will recall, with the gophers of the Northwest. A circular (No. 3) on the "Economic Relations of Mammals" was brought out by Dr. Merriam in that year. Some similar publications and some bulletins on mammalogical subjects were brought out in following years. It was not until well into the nineties, however, that complaints from all over the country, but overwhelmingly from the West, began to pile up about the depredations of wolves, coyotes, and other predatory animals upon stock, and of the damage to forage crops, orchard trees, truck gardens, etc., caused by various species of rodents. It had been predicted that the wolf would go with the buffalo, but it soon appeared that he had no such intention so long as any sheep and cattle remained on the Western ranges. The coyote, useful to man as a destroyer of rodents,⁷⁵ and to some extent of insects, early developed a taste for mutton that put him far into the class denominated predatory.

In short, precisely the same thing happened in the mid and far West as regards the wolf and coyote and other predatory animals—and as regards the noxious animals as well, as will be brought out later—that has already been described as threatening the "balance" from the times of the earliest settlements in the East. That is to say, the new sources of food supply for such animals, which the coming and growth of stock-raising and farming brought on an ever-increasing scale, caused them to "flare-up" reproductively on a corresponding scale and—unless effectively checked—to exact from these new utilizations of their ancient ranges a progressively mounting toll of destruction.

It was in connection with the bounty system that the Survey first came into touch extensively with the warfare against these

⁷⁵ As to the extent of the coyote's usefulness in this regard, there is difference of opinion, some holding that before he took to sheep-stealing he played an important part in preserving the "balance" by his consumption of rodents, others denying it. A recent writer in a stockman's magazine declares that "it is a mistake to believe, as many do, that the coyote is or ever has been a very important agency in preventing rodent increase. The worst jack rabbit plagues occurred when the coyote was in normal numbers."

pests, particularly the predatory sort. Naturally this warfare was at first a purely local affair—an every-state-for-itself matter, when it was not even more minutely localized—and just as naturally the weapon first laid hold of in that warfare was the bounty. It was the magnificently obvious way to stimulate the destruction of the lupine⁷⁶ enemies. Its stimulative possibilities along other lines were for the moment unnoticed. Another thing unnoticed at first was the fact of the futility of any system that attempts to oppose the universal with the here-and-there. Wolves and coyotes ranged where they would. But the bounty system, leaving out of consideration altogether its grave inherent weaknesses,⁷⁷ could oppose to this ubiquity only a patch-work defense; strong here, weak there, non-existent somewhere else, depending upon whether the local governments employed it efficiently, bunglingly, or not at all.

But by the late nineties, by which time bounty legislation consideration had come to be a part of the agenda of practically every Western state legislature, indications of a movement toward co-ordination of effort began to develop. Thus, at the convention of the American National Live Stock Association in Denver, in 1899, wolf bounties were extensively discussed not only as regarded amount and administration but as regarded uniformity and universality. The convention favored the enactment of uniform bounty legislation in all the Western states and territories, the legislation to be as permanent as it could be made, and the rewards offered to be “sufficiently large to be effective.”⁷⁸ It was arguing, in short, for the presentation of a united front to the common enemy; for the beginnings of what has come to be extensively referred to of late as a “west-wide” plan.

The very bounty contacts which the Survey had had to make at this time in ever-increasing numbers could not fail to help along this tendency toward uniformity. The Survey had come to be a sort of a central bounty information bureau, to which state legis-

⁷⁶ To say nothing of feline ones—and others. Wolves and coyotes have always constituted the bulk of the Western stockman's predatory animal troubles; but mountain lions, bobcats, lynxes, and, occasionally, bears, have also contributed to the annual herd losses.

⁷⁷ See “Extermination of Noxious Animals by Bounties,” Yearbook, 1896, pp. 55-68. Bounty legislation in America dates back to 1630. From that time until to-day over four hundred bounty laws have been enacted.

⁷⁸ Biological Survey, Annual Report, 1899, p. 65.

latures considering bounty legislation were applying extensively for data. This sort of thing of course could not fail to create, consciously or unconsciously, a progressive looking toward Washington for counsel and aid. The same comment applies to the further step taken by the Survey in the early 1900s—the developing of an effective poison for the Western rodents in response to the appeals for assistance from the gopher, prairie dog, and ground squirrel-infested regions.⁷⁹

In 1905-1906, the period, it will be recalled, in which bureau status was attained, and economic mammalogy accorded a place of greater importance in Survey organization, a more decided step toward headship was taken in the undertaking by the Survey, at the request of the Forest Service, of a thorough investigation of the problem of the wolf⁸⁰ on the grazing areas lying in the forest reserves. The results of this investigation were published by the Forest Service early in 1907, and by the Survey in briefer form later in the same year.⁸¹ These publications, designed for wide circulation among stockmen, ranchers, and hunters in the West, described the most approved methods for destroying wolves and coyotes. All the well-known systems, including shooting and trapping, were touched upon, but special emphasis was given poisoning, den-hunting during the spring breeding period, and wire-fencing. The great value of the comparatively simple method of den-locating, with subsequent destruction of the litters, was strongly recommended and was gone into in considerable detail. Fencing as a protection of special limited areas was also advocated.

⁷⁹ Such work, of course, was "economic," pure and simple. Nevertheless, it was performed at the time, 1901-02, by the Section of Geographic Distribution. All of which is but further evidence of the change in emphasis economic law was bringing about.

⁸⁰ Likewise an "economic" job performed by the Section of Geographic Distribution.

⁸¹ "Wolves in Relation to Stock, Game, and the National Forest Reserves," by Vernon Bailey, Assistant in Charge of Geographic Distribution, Biological Survey; Forest Service Bulletin 72, January, 1907. "Directions for the Destruction of Wolves and Coyotes"; Biological Survey Circular, No. 55, March, 1907. Biological Survey Circular No. 58, published the same year, was "Destruction of Deer by the Northern Timber Wolf." See also two publications of 1905 having to do with the relation of the coyote to Western stock raising: Farmers' Bull. 226, and Biol. Surv. Bull. 20.

The Forest Service in the following year made some fencing experiments after a plan worked out by the Survey.⁸²

As a result of the efforts of the stockmen and of the rangers and special hunters⁸³ on the forest reserves along the lines recommended in these publications a record kill of predatory animals was made in 1907. Over one thousand eight hundred wolves and twenty-three thousand coyotes were accounted for. The estimated resulting saving in stock was \$2,000,000.

For several years after this initial assistance to the Forest Service the work of the Survey in connection with predatory animal control was almost entirely of an advisory or investigational nature. Besides the according from time to time of counsel to the Forest Service similar in nature to that already discussed, advice was given on occasion to states, counties, and stockmen's organizations in connection with the payments of bounties and rewards. This system of stimulation of the destruction of predatory animals continuing to be employed extensively in combating the menace, there inevitably developed fraud on a considerable scale. All sorts of heads, even those of calves, were doctored up and turned in as those of wolves, coyotes, and other creatures commanding a price. A great deal of money was thus spent in bounty-outlay with no appreciable result in the cutting-down of the yearly herd casualties. To make the palming-off of fraudulent scalps and heads more difficult, the Survey prepared a key describing the essential distinguishing characteristics of wolves and coyotes.⁸⁴

In 1914 as a result of the continuous pressure from the West for further governmental assistance against the menace which it was seen the bounty could not successfully combat, Congress made a small appropriation for experiments and demonstrations in predatory animal control.⁸⁵ In the following year the first sizeable appro-

⁸² A reflection of this work in connection with Forest Service activities of that day is to be seen in Forest Service Bulletin No. 97 (published 1911), "Coyote Proof Inclosures in connection with Range Lambing Grounds."

⁸³ A part of the Forest Service organization that was later discontinued, as will be shown.

⁸⁴ The defrauding of local governments via the bounty laws is not yet entirely a thing of the past. As recently as 1926, a scheme to collect coyote bounties in one state, on skins imported for the purpose from another, was uncovered.

⁸⁵ Act of June 30, 1914 (38 Stat. L., 415, 433, 434, 435).

priation for the purpose was made, \$125,000,⁸⁶ and the language of the act called for direct participation by the Survey in the suppressive warfare instead of a mere instructive rôle. It directly ordered the destruction of wolves, coyotes, and other animals injurious to agriculture and animal husbandry on the national forests and the public domain, and thus definitely took out of the hands of the Forest Service the fight it had been waging since 1905,⁸⁷ and made it a part of the regular job of the Survey.

The very great increase in this same year of rabies among the wild animals,⁸⁸ and particularly the coyotes, in the territory roughly embraced in southeastern Oregon, northern California, southern Idaho, and northern Nevada acted as a decided stimulus to the trend which had been gradually making for several years toward the centering of wild animal control work in the Survey, where it logically belonged. This epidemic became so alarming that Congress appropriated \$75,000 for its immediate combating by the Survey in the urgent deficiency appropriation act of February 28, 1916 (39 Stat. L., 14, 24, 25), and gave the Secretary of Agriculture broad discretion as to procedure. The work to be done, moreover, was not restricted to the national forests and the public domain, but in effect extended to any part of the Western or Northwestern country in which the infection might appear. This appropriation was followed by one of \$125,000 for the same purpose in the regular agricultural appropriation act of that year (Act of August 11, 1916; 39 Stat. L., 446, 466, 467), with a similar width of operating latitude. The work provided for in the two appropriations was performed by the same special force of hunters,⁸⁹ trappers, and poisoners which had been organized as soon as possible after the first large appropriation for predatory animal control work on the forests and the public domain became available in March, 1915. The entire Western country was divided

⁸⁶ Act of March 4, 1915 (38 Stat. L., 1086, 1104, 1105).

⁸⁷ The Forest Service did the work partly with its regular force of rangers, partly with a small force of specially employed hunters and trappers.

⁸⁸ Rabies first broke out among wild animals in the West in California, in 1909, and has not yet been completely suppressed. Besides the great stock losses, more than two thousand persons have been bitten, about sixty of them fatally.

⁸⁹ Superseding the special force of hunters previously maintained by the Forest Service.

into eight districts, with an inspector in charge of each, and an inspector-at-large in charge of them all. The men employed devoted their entire time to the work, and all skins of animals taken by them became the property of the government. Something less than sixteen thousand animals were destroyed during the year and definitely accounted for. A great many more were unquestionably killed by poison and never found.

It will thus be seen that the predatory animal work by 1916 had come to consist of two principal activities: the destroying of such animals wherever found in connection with the rabies suppression work. The appropriations for these two lines of work in 1916⁹⁰ constituted considerably more than half of the total appropriation made that year for the purpose of "investigating the food habits of North American birds and mammals in relation to agriculture, horticulture, and forestry." And when it is considered that a further portion of this general appropriation was required to be devoted to "experiments and demonstrations in destroying" predatory animals, the commanding place that predatory animal control had come to occupy in the Bureau's premier activity of "economic relations"—for that, and that alone, is what the "food habits" work was—will be apparent.

The work thus begun, and thus developed into an outstanding activity of the Survey, has been continued to this day. Its relative importance in comparison to other work done, as attested by the yearly appropriations made for it, has remained proportionately about what it was in 1916. Of the total appropriation made for 1929, for example,⁹¹ \$1,165,000, the work in food habits research is allotted more than half, \$662,000, of which sum in turn predatory animal control accounts for little less than half.⁹² During the

⁹⁰ Cf. "food habits" clause in the act of August 11, 1916 (39 Stat. L., 446, 466, 467).

⁹¹ Act of May 16, 1928 (45 Stat. L., 539, 558).

⁹² The exact proportions are as follows: total for food habits research, \$662,000; for predatory animal control, \$313,080.

It is also to be noted that all restrictions as to area have been removed. In 1920—Act of May 31, 1920 (41 Stat. L., 694, 715, 716, 717)—the language of the clause appropriating funds for food habits investigations dropped all references to national forests and the public domain and simply decreed a general warfare against all animals injurious to "agriculture, horticulture, forestry, animal industry, and wild game." Cf. food habits clause in this act with same clause in agricultural appropriation acts from 1915 to 1920. The broader language of the 1920 act has been retained and is employed in the current Agricultural appropriation act of May 16, 1928.

World War period, 1917-19, the importance of the work in connection with the vital matter of food conservation was recognized with generous allotments of war emergency funds.⁹³

The story of the organization and unremitting prosecution of this warfare against one mighty natural force to the end that another just as natural—civilized development—may go forward, is the most fascinating chapter in a history of the development of a governmental activity that contains from first to last but few pages that are dull and uninteresting. But for obvious reasons it can receive here at best but sketchy treatment. The reader desiring details of the many fiction-rivaling episodes having to do with the duels of wits between the Survey hunters and some more than ordinarily wily stock-killing wolves, coyotes, cougars, or bears will have to seek them himself in the Survey's publications.⁹⁴ It must suffice here to note briefly some of the more important features of the work in general.

First of all it should be clearly understood that the work has all along been distinguished by the feature of coöperation. The national government has directed it, but it has not done it all in either an actual or a financial sense. The amounts appropriated by the national Congress to be expended in the employment of hunters and trappers, and in the purchase of rifles, ammunition, traps, and poison, have been supplemented by appropriations of state legislatures, assessments levied against their members by stockmen's associations, and direct expenditures of individuals.⁹⁵ The monies so raised have not been turned over to the national government for direct expenditure, but inasmuch as they have been expended almost altogether in conformity with general operating plans worked out by the Survey the results attained have been practically the same.⁹⁶ The growth of the coöperative effort is well

⁹³ See Financial Statements, Appendix 5.

⁹⁴ See, for example, the Survey reports for 1920 and 1921. Also "Hunting Down Stock Killers," Yearbook Separate No. 845.

⁹⁵ Since 1915 a total of \$10,212,353 has accrued from these and similar sources. See statement on coöperating contributions in Appendix 6.

⁹⁶ In a general way the national government has provided the men and material for the work on federal lands, the coöperating agencies that for the work on state and private lands. The national government, through the Survey, has planned the operation as a whole. Besides the contributions of funds, the coöperating agencies, particularly those represented by individuals and associations of individuals, have contributed considerable actual physical assistance in animal drives, poison placing, hunting, trapping, etc.

told by the figures on expenditures by coöperating agencies. These agencies spent \$8934 in 1915-15. In 1924-25 they added \$389,374 to the national government appropriations for the work by the Survey.⁹⁷ By 1926 the coöperative predatory work had come to be well established in sixteen states,⁹⁸ the coöperating agencies ranging all the way from state governments to individuals, through state agricultural departments, state livestock commissions or boards, game commissions, agricultural extension departments, county organizations, and stockmen's and farmers' associations. The work has also developed participation with and assistance to the various federal agencies especially interested by reason of their control of public lands or the nature of their activities—such agencies as the Forest Service and the Bureau of Animal Industry of the Department of Agriculture, and the Office of Indian Affairs and the National Park Service of the Interior Department. Consultative and laboratorial investigative assistance has also been given to the Survey by the Bureaus of Chemistry and Plant Industry of the Department of Agriculture.

In the coöperation with state and private agencies a working basis along the lines of clear-cut business agreements has been worked out covering policy, procedure, and finance. No legal controversies over these agreements have arisen because mutual understanding and far-sighted planning have been aimed at. A spirit of teamplay has been developed, and a program has been worked out with sufficient flexibility to meet local requirements.

The best gauge of the success of the work is its measure of accomplishment. Predatory animals in the great stock-raising areas of the West have not been exterminated. They still exact a not inconsiderable yearly toll from the herds. But that toll is no longer the twenty to thirty million dollars that it used to be,⁹⁹ and it is constantly being reduced with the passage of time and with the tightening-up of the coöperative control system, which year by year strengthens its grip on the situation, through ripper experience

⁹⁷ National funds available for predatory animal control in the same period amounted to \$270,967. Cf. Biological Survey, Annual Report, 1925, p. 3.

⁹⁸ Arizona, California, Colorado, Idaho, Michigan, Minnesota, Missouri, Montana, Nevada, New Mexico, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

⁹⁹ A Survey estimate of late 1926 placed it at \$12,000,000.

and progressive improvement in method. It is now pretty generally agreed that the end of the wolf is in sight. His known casualties,¹ accounted for by hides and heads, had reached a total of about six thousand by 1926, and practically all of the most notorious stock-killers had been accounted for. In a general way, similar comment may be said to apply to the cougar (or mountain lion), the lynx, and the bobcat. Their depredations have been controlled, and their ultimate elimination, though not so apparently imminent as that of the wolf, is only a matter of time. The coyote has been definitely checked but still exists in numbers, and his complete extermination, it is safe to say, lies a long way in the future. Bears have been destroyed to but a limited extent, and only when circumstances rendered it imperative. The bear is not, properly speaking, a predatory animal; he is a game animal, and is always so classified. Unfortunately, individual bears occasionally become addicted to a diet of lamb, goat, steer, or colt. Once they do this they are killers for life and can only be shunted from their evil ways by complete elimination. Occasionally, too, the Survey and allied hunters have been called upon to dispose of dogs that have gone wild and taken to ways as predatory as the natural ways of their wolf and coyote cousins. Instances of dogs going wild have been fairly common in the West in the past twenty years, and one theory of the start of the rabies epidemic is that it was set going by one of these vagrant dogs in which the disease developed.²

Considerable advance in method and efficiency has been made during the ten years in which the Survey has directed the work.

¹ That is, from the start of the work in 1915.

² Of course dogs do not need to "go wild" in order to become fairly predatory. The sheep-killing dog that lives at home quietly by day and goes forth to destroy by night is an old story in the older settled parts of the country. The existence of such dogs was made one of the excuses for a novel proposal advanced to the House Committee on Agriculture in 1918. It was proposed to levy a federal tax of one dollar per dog upon the seven to ten million dogs in the United States, from three to six millions of which are said to be worthless or worse. The funds so raised were to be devoted to killing off predatory animals and bad dogs. It was urged that the Biological Survey and its coöperators could not hope to do more with the resources granted them than to keep down the increase of predatory animals to its existing level. No bill was introduced, however. The committee was friendly to the idea but sceptical regarding its constitutionality.—Miscellaneous Hearings before the House Committee on Agriculture, 65 Cong. 2 sess., March 8, 1918.

The automobile and the motorcycle have been utilized to secure rapid concentration of hunters in districts in which bad animals are on the rampage. Great improvements have likewise been made in the effectiveness of poisons and in the technique of their distribution. Placing poison for animals of the truly satanic cunning of wolves and coyotes has in fact become a fine art. Its development to that status has been one of the outstanding achievements of the Survey's predatory animal work, in which work the use of poison is rapidly coming to supersede all other methods of suppression. In the season of 1923, for example, over two hundred thousand square miles were covered with one million seven hundred and three thousand carefully placed baits. A laboratory for experimentation with new poisons was established in Albuquerque in 1920, and moved to Denver in 1922. All of the poison used by the Survey and its collaborators is now processed at this laboratory.³ In 1923 an application for a patent for a new poison developed for use in this work was applied for on behalf of the Department of Agriculture.

Another capital bit of work by the Survey, rivaling that done in poisoning, has been the development of various scents for use as a camouflage in poison-placing as well as in connection with the trapping of wolves, coyotes, and the feline animals, cougars, bobcats, and lynxes. The latter have found the oil of catnip quite irresistible; and its use, first developed and perfected by the Survey,⁴ has gone far toward making the trapping of these cats, so terribly destructive to wild game as well as to domestic stock, a safe bet rather than a possibility.

Rabies has not been entirely eliminated, but its status has been pushed back from virulence to quiescence. The great outbreak of 1915 was under fair control by 1919, and was definitely stopped by 1921. There was another outbreak in eastern Washington in

³ This statement applies to poisons for the work against noxious animals as well as for that used against the predatory ones.

⁴ In 1923, after a representative of the Survey had ascertained that the scent of oil of catnip attracted the feline predatory animals. Some difficulty in making the discovery effective was experienced, inasmuch as the oil of catnip was not produced in commercial quantities. The difficulty was partially overcome with the assistance of the Bureau of Plant Industry, which planted a small area to catnip on the Arlington Experimental Farm, from which some oil has been procured for the use of trappers.

1922, and two more in 1924, in which year the menace also flared up in Colorado. In all these instances the strategy evolved by the Survey was found to control the situation effectively. The instant concentration of heavy forces of hunters about the danger points, followed by the intensive extermination of all possible disease carriers found, and strengthened by the establishment of a quarantine, stopped the trouble at the source, and prevented the recurrence of such another widespread outbreak as that of 1915. It is believed that this now thoroughly organized and established system, capable of being applied at short notice to any area at need, makes such another outbreak a practical impossibility.⁵ In this work, it is to be understood, there has been the same sort of coöperation between the Survey and local authorities and interests as has already been described in connection with the ordinary predatory animal work. There has been local contribution of funds and of man-power and special exercise of local police power. The Survey has contributed men and money, and has exercised general direction of the campaigns.

The system just described was called into play in 1924 and 1925 in connection with a faunal crisis of a new sort—an outbreak of the foot and mouth disease among the deer of central California, particularly of the Stanislaus National Forest. After all domestic stock had been removed from the ranges, a force of two hundred hunters under the direction of the field representatives of the Survey, constituting a coöperation of the Survey with all the directly interested authorities,⁶ state and national, surrounded the affected area and killed all the deer they could find. It was unfortunately necessary to destroy in this way over twenty-two thousand deer. Naturally the resulting sentimental ululation was on a corresponding scale. The sentimentalists, as is their invariable wont, failed to figure in the hard, practical aspects of the case. That is to say, they ignored absolutely the possibility, if not the exceeding probability, that half-way measures, or no measures at all, would result

⁵ Speaking of this rabies control work before the House Committee on Appropriations, on December 29, 1925, the Chief of the Survey declared: "The Biological Survey, I believe, has justified its existence by the one service it has given in controlling rabies in the Western States."

⁶ Bureau of Animal Industry, Forest Service, National Park Service, California Agricultural Department, and California Game Commission.

in a nation-wide spread of this malady that might very conceivably have disastrous effects upon agriculture and animal husbandry.

All in all, the progress made by the Survey in predatory animal control since the beginning of the work may conservatively be described as satisfactory. With equal safety may it be asserted that the Survey has made, and is making, in the work the utmost of the resources it controls. It has killed, and is killing, as many predatory animals as it could be expected to kill with the men and money at its disposal. As to this there is general agreement.

In recent years, however, there has developed considerable opinion to the effect that the nation's predatory animal policy is a nibbling policy that is uneconomical in the long run; that it would be better to go at the problem on a grand scale for a period of years, and finish it up once for all—so far as that might be humanly possible—than to string along in the present fashion of just about keeping up with the annual increase. Expression of that slant of opinion has already been given in what has been said above regarding the idea of a federal dog tax.

Very recently this point of view was the moving power behind a proposal that may lead in the not far distant future to a considerable expansion of the predatory control work of the Survey. Representative James P. Buchanan, of Texas, a member of the subcommittee of the House Committee on Appropriations that considers the annual appropriation bills for the Department of Agriculture, brought the matter up at the hearing on February 7, 1928, when the estimates for the Survey for 1929 were being considered. Expressing himself as being skeptical of the wisdom of continuing a piecemeal policy in the predatory work, he advocated the expenditure of more money and the institution of an intensive five-year campaign by the national government, the states, and the stock-raisers' associations and kindred organizations in coöperation.⁷ The result of this was the inclusion of a proviso in the Survey appropriation in the act of May 16, 1928 (Public No. 392—70th Cong.), calling upon the Secretary of Agriculture to report to the next regular session of Congress upon the feasibility of such a campaign, and its probable cost as compared with the present method.

⁷ House Hearings on Agricultural appropriation bill for 1929, 70 Cong. 1 sess., p. 631 *et seq.*

Less spectacular and generally interesting than the predatory animal control, but of much greater import in an economic sense, has been the fight waged by the Survey, and by local governments and interests under Survey direction, against animals of the noxious type. It is estimated that the house rat⁸ alone, which has been described "of more universal concern to the people of the United States, from the Atlantic to the Pacific, than any other wild animal pest,"⁹ destroys food stuffs and other materials worth \$200,000,000 every year, besides constituting an exceedingly grave menace to the national health by reason of its potentialities as a disease-carrier. Other noxious creatures, chiefly of the rodent kind, which the Survey has been combating more or less constantly for the past quarter-century, create some \$300,000,000 worth of annual havoc.¹⁰

The reason the Survey entered upon this work has already been given in what has been said descriptive of the gradual up-growth of the work in predatory animal control. It was simply the demand of the stockraisers uttered by the farmers—the demand of growing agriculture for protection against a menace which grew as agriculture grew because agriculture gave it the wherewithal to feed its augmented increase.¹¹ In short, a perfect illustration of the workings of the "balance of nature." Likewise a perfect illustration of the force that made economic relations the paramount interest in governmental biological work, and that impelled that denial by a Survey officer that the Survey was pursuing science merely for the sake of science which we have quoted hitherto.

The reader will recall that economic mammalogy was accorded, in the year 1905, a theretofore unprecedented place of importance in

⁸ That is, the common brown, or Norwegian, rat, infesting buildings of all sorts, wharves, and ships as distinguished from special types such as the wood rat, cotton rat, etc.

⁹ Biological Survey, Annual Report, 1924, p. 13.

¹⁰ A fairly comprehensive list of the noxious foes of the Survey includes the following: gophers, prairie dogs, various types of ground squirrels, various types of rats and mice, muskrats, crawfish, various types of rabbits, moles, land crabs, woodchucks, hedgehogs, and sewellels, or mountain beavers. The porcupine might possibly be included because of the economic problems it presents in some of the forest regions of the Southwest.

¹¹ This statement is true directly, of course, only of those creatures that attack agriculture, so to speak, "at the source," destroying crops in the field. It is just as true of the house rat, but in an indirect sense.

the affairs of the Survey. The great influence that the ravages of the predatory animals upon the Western herds had in connection with this vast change in viewpoint from the more or less academic interest in the northwestern gophers in the eighties has already been made plain to him. The even greater influence of noxious animal ravages in bringing about this change has heretofore only been hinted at. A brief outline of this phase of the development will now be given.

In the late nineties the noxious animal problem had become a matter of such local concern throughout the West that much consideration began to be given to possible remedies *via* legislation, either the old, familiar, when-in-doubt resort, the bounty; or the legal requirement saddled upon the landowner to rid his land of its infesting rodents, a scheme that had been tried out in California in the seventies with anything but conspicuous success. Legislation of this sort was considered in Texas in 1899, and a law providing for compulsory assessments for the payment of bounties in Washington in the same year. The depredations of prairie dogs and ground squirrels in these two states had become so serious as to more than justify an impatience on the part of the farmers for some effective action. In one country of eastern Washington the annual ground squirrel bill, counting in the cost of repressive efforts as well as the actual damage done by the rodents, had come to amount to half a million dollars. Throughout the West generally the noxious animal situation was bad and was getting worse.

Hope of accomplishing anything by means of the bounty method in combating these pests was soon given over as impracticable. It was too small scale. It came to be recognized generally that something of a wholesale nature was needed—poisoning throughout great areas, for example. Following which the Survey began to be importuned for a poison that was at once effective, safe, and cheap.

The first decade of the present century was in consequence devoted in ever-increasing measure to grappling with this economic problem, the work, however, being done by the scientific section of geographic distribution until that phase of the Survey's work became of secondary import, as hitherto described. There were field experiments with traps and gases as well as with poisons,

particularly in connection with an amazing outbreak of field mice in the Lovelocks region of Nevada in 1907-08, in which an almost unbelievable infestation of these little creatures, reported as being as many as twelve thousand to the acre,¹² utterly ruined the crops throughout a great part of this irrigation district.

Great hope was entertained during those first few years of solving the problem of noxious animal control through the development of viruses or bacilli by means of which fatal epidemics might be set going among the various species and their destruction on a large scale thus secured with both certainty and cheapness. Considerable experimentation and research¹³ along this line, however, led to nothing but disappointment. To isolate bacilli of many of the destructive animal epidemics was found to be comparatively simple. But to get them to work contagiously as they do in nature was another matter. They would kill the original animals directly infected with the cultures, but all efforts to set plagues in motion by their instrumentality were failures.

It gradually came to be recognized that effective mineral poisons plus widespread coöperation constituted the best if not the only weapon to be employed—that a system that suppressed rodent pests on four-fifths of an area, and allowed them to flourish undisturbed on the remaining one-fifth, whence they could overflow at will onto the protected area and quickly undo all the results of the expended treasure and labor, was a system that got nowhere in particular. This fact was brought out with especial force by the situation in California. There the state, the local governments, and private interests were making strenuous efforts to rid the land of rodents; but on the California national forests nothing was being done, and the forests were being made to serve, in effect, as noxious rodent sanctuaries. The same situation applied to national forests wherever situated, a state of affairs which the national forest officers viewed with anything but complacency, inasmuch as it affected them adversely in two ways. The forest rodent sanctuary situation bred

¹² They were so numerous that the "balance of nature" came to the rescue very effectually while man merely looked on and experimented. That is to say, the hawks, owls, gulls, eagles, coyotes, etc., assembled to the feast from great distances and lived on a diet of mouse with great satisfaction, thus, in a measure, answering Forbes' query of the early eighties.

¹³ Partly by the Survey alone, partly in coöperation with state agricultural experiment stations and with the Bureau of Animal Industry.

among the farmer and stockmen neighbors of the forests a feeling of resentment for which there was abundant justification. At the same time the immunity which the rodents on the forests were enjoying was creating a force tremendously destructive to the forests themselves; a force that constantly combated, through seed-eating squirrels and such, the efforts of the forests to reproduce themselves naturally; and that largely nullified the efforts the foresters were making toward artificial reforestation by means of nursery work and hand planting of both seeds and seedlings. Rodent fighting thus came gradually to be seen as a game in which everybody with anything at stake must take a hand. The utter futility of partial effort gradually became manifest.

These influences, in short, produced the same reactions we have already observed in connection with the predatory control work—reactions toward coördination of effort and unity of control; toward the “westwide plan” idea with the Survey in general charge. The development of this tendency is significantly illustrated by the concurrent development in legislation. Thus, the widespread demand for poisons at once “effective, cheap and safe” led to the addition, to the “food habits” clause in the Agricultural appropriation act of March 4, 1909 (35 Stat. L., 1039, 1051), of language directing that the food habits investigations should include “experiments and demonstrations in destroying noxious animals,” \$25,000 being appropriated for this specific purpose. As a result of the intensified anti-rodent work thus inaugurated several very effective poisons were developed within the next few years, mostly various compounds of strychnine. The rather extensive work of carbon bisulphide was also demonstrated.

To the same clause there was added in the act of August 10, 1912 (37 Stat. L., 269, 292, 293), a proviso directing that \$3000 of the sum appropriated should be devoted to the destruction of ground squirrels on the national forests in California—the first direct reaction to the growing demand for coördination of effort in the noxious animal work. In the following year—act of March 4, 1913 (37 Stat. L., 828, 846, 847, 848)—this proviso amount was boosted to \$15,000, and the restriction to California national forests was removed; the money being appropriated for destruction of ground squirrels on all the national forests. The same proviso, in the same amount and in the same place, appeared

in the agricultural appropriation acts for the two years following (38 Stat. L., 415, 433, 434, 435 and 38 Stat. L., 1086, 1104, 1105). In the first of these acts there is also to be noted an important change significant of the strong trend that had set in toward Survey-directed coördination. The expression "noxious animals," which we have heretofore noted as marking the same trend in 1909, was changed to "wolves, prairie dogs, and other animals injurious to agriculture and animal husbandry." The other act is the act of the big year of 1915 which we have already examined in connection with the predatory animal control—the act that put the Survey directly in the work of a destroyer of predatory animals, instead of a mere demonstrator as to how that work should be done, by appropriating \$125,000 for predatory animal destruction on the "national forests and the public domain." The jump in appropriations for the food habits clause in the years following 1909 is likewise to be noted. The \$25,000 appropriated for "noxious animals" work in that year jumped to \$35,000 in 1911, to \$43,000 in 1912, \$60,000 in 1913, \$115,000 in 1914, and \$280,000 in 1915.¹⁴ These increases meant that by 1915, in addition to the \$15,000 it was spending under the special proviso for "the destruction of ground squirrels on the national forests *and other public lands*,"¹⁵ the Survey was expending not less than \$50,000 for experimentation and demonstration with regard to the destruction of all rodents and other noxious animals everywhere in the country. That is to say, by far the larger part of the noxious budget was going for the teaching of destruction, whereas the larger part of the predatory budget was going for actual destruc-

¹⁴ It should be noted that part of this increase was due to the fact that experiments in the raising of fur-bearing animals began to be appropriated for under this clause in 1912. In 1914 and 1915 small appropriations for special investigations of duck diseases in Utah were also made under it. Also 1914 was the year in which the change was made in the "noxious animals" clause.

¹⁵ The italics are mine. The expression "and other public lands" was added in the 1915 act, thus completing the national government's sphere of operations in the destruction of noxious animals, as "other public lands" includes not only the public domain but all government reservations, such as parks, monuments, etc., of whatsoever nature. In other words, by 1915, the Survey had statutory authorization to engage in the destruction of noxious animals on all government property; but it possessed like authority with regard to predatory animals only on national forests and the public domain.

tion.¹⁶ Rodents were being killed by the Survey field force on the public domain and the various types of government reservations. On private lands demonstrations in the most effectual spreading of poisoned grain and other rodent bait were being staged, with the active coöperation of local interests.

The story of the work since then is simply one of gradual growth in territory covered and in the enlarging and perfecting of the coöperative organization. The coöperative lines followed have been largely those followed in the predatory work, with somewhat stronger emphasis than in that by reason of the fact that in the noxious work so much larger a proportion of the direct physical work is done by the coöperating elements. Coöperation has been with the states, counties, and localities through the state extension organizations, state departments of agriculture, and agricultural commissions, county agents, farm bureaus, and stockmen's and farmers' organizations. Where federal land is involved, or some special form of national activity interested, the federal agency in control thereof has been called into the organization. Sometimes this agency is the Office of Indian Affairs; sometimes the Forest Service, the Park Service, the Bureau of Animal Industry, the Bureau of Reclamation,¹⁷ or some other.¹⁸ The effort has always been made to get every interest, national, state, and private, to pull together. The general policy of the Survey has been to demonstrate the method to be pursued in some particular campaign in a region suffering with some particular infestation, and then, after local interest has been stimulated, and a general understanding disseminated regarding the proper strategy to be pursued, to organize the offensive, that is to say the coöperation, against the common enemy. There have been times when these offensives have been on a very large scale—inter-state in fact.

¹⁶ Of the entire appropriation of \$280,000, about \$40,000 went to the fur and duck experiments. Of the remaining \$240,000, \$125,000 was for direct destruction of predatory animals; \$15,000 for that of noxious animals. This left \$100,000 for experiments and demonstrations with regard to both, or \$50,000 apiece. The ratio, then, of direct destruction to demonstration was 125 to 50 in the case of the predatory animals; 15 to 50 in that of the noxious.

¹⁷ The Bureau of Reclamation in its work has been considerably handicapped by the dike-boring propensities of some of the rodent pests, which have at times seriously crippled irrigation systems.

¹⁸ During the war year, 1918, the state Councils of Defense in Arizona and New Mexico took part in the work.

As has already been pointed out in the case of the predatory work, the success of the noxious animal work is best demonstrated by the local reactions to it. Where a system is liberally aided financially year after year by local coöperating interests it must possess value of a sort. In the year 1925, for example, already instanced to illustrate local contributions in the predatory work, state and local funds totalling over \$454,422 were contributed to the noxious animal work; contrasting rather favorably with a federal appropriation of \$158,675 for the same purpose in the same period.¹⁹

In 1919 it was estimated that the rodent control work saved \$14,000,000 in foodstuffs to the country. The estimated saving in 1924 was \$4,000,000, with a total of \$72,000,000 since the work began. The sum of \$6,500,000 was saved in 1926.²⁰

Comment upon the work done by the Survey in connection with the domestic rat has been left to the last, as it is in many respects a separate and a different problem. For one thing it is a nation-wide rather than a "west-wide" problem. It is of the centers of population rather than of the thinly settled areas where the coyote and the gopher reside. The Survey found it necessary to take up anti-rat work within a year or two after the advance to bureau status in 1905. Considerable work was done at first in the way of the investigation of various viruses by which it was believed—as had at first been believed with regard to the plains rodents—that epidemics might be introduced among the rats that would eliminate them *en masse*. Much investigation of this sort, however, only served to prove that all the viruses tested fell down completely on the great desideratum—transmissibility from rat to rat. Since the practical abandonment of these investigations the Survey has concentrated its efforts along what might be termed preventive lines. It has assisted in the various campaigns for national education with regard to the rat menace, and has strongly advocated the rat-proofing of buildings and wharves, the fumi-

¹⁹ Coöperative rodent funds totalled \$601,000 in 1923, in which year twelve public land states made direct appropriations for the work, and seven additional states contributed through private subscription. Over 100,000 farmers took part in the poison-spreading.

²⁰ The high figure of 1919 as compared with other years is due to the fact that it was an unusually well-financed year—due to the war emergency funds—and a much larger territory was covered in the work.

gation of ships' holds, the making as near inaccessible to rats as possible of all manner of foodstuffs, and the organizing and conducting by municipalities and communities of frequent extermination drives. It has helped in the educational campaigns with demonstrations on the use of traps and poisons, methods of rat-proofing, etc., and by publishing and distributing pamphlets and leaflets containing information along these lines in simple and readily understandable form. Coöperation has been had with the Bureau of Animal Industry with regard to protection from rats about the plants of the packing industry. During the World War the Survey had men at the Bush Terminal in New York and at other points where great stocks of food-stuffs had been assembled. The anti-rat measures they instituted were highly successful in preventing great food losses. Three members of the Survey personnel were likewise commissioned in the Sanitary Corps and sent to France to combat rats in the trenches and about the great supply bases. Others served as enlisted men.

The rat work in the trenches had a medical aspect, of course, that was, if anything, greater than its economic aspect. It is scarcely too much to say that like comment applies to the work in general in the United States. That particular phase has never been compared in terms of dollars and cents with the \$200,000,000 damage bill which the rat annually runs. But the constant menace of bubonic and pneumonic plague²¹ which this loathsome animal's mere presence holds in the background as a possibility is too tremendous a thing to be measured that way—a thing the terrible potentialities of which has abundantly justified the work done by the Survey in coöperation with the Public Health Service.

This coöperative work began in the early years of the present century. As a matter of fact, it began at the time the very first rat work by the Survey was started in connection with the outbreak of bubonic plague in California in 1907 and 1908 which the Public Health Service was combating. In practically everything the Survey has done in rat work—in demonstrating, educating the public, advocating precautionary measures, etc.—the influence of the Public Health connection has been manifest. This

²¹ It is believed that the rat is also instrumental in the spread of avian tuberculosis which is responsible for large losses in the poultry-raising industry.

alliance is well illustrated by the work on "The Rat in Relation to Public Health," published by the Public Health Service in 1910. Three important chapters of that work, covering the natural history of the rat, the natural enemies of the rat, and the rat as an economic factor, were written by Professor D. E. Lantz, of the Survey.

The rat is responsible for by far the greater part of the Survey's contacts with the fields of health and sanitation, but it is not solely responsible. The rat is not the sole dangerous disease carrier among the mammals. Certain of the ground squirrels of California have been found to harbor the same fleas by means of which the rat disseminates the bubonic plague. It is believed that the rat is originally responsible for this condition—that the squirrels acquire the fleas from infected rats in regions contiguous to the ports where the ranges of the animals come into contact. Likewise, it has been ascertained that the ground squirrels and certain other mammals in Montana are distributors of the ailment known as spotted fever by means of the parasites with which they are infected. A disease known as tularemia has been spread somewhat widely by the wild cotton-tail rabbit.²² In the combating of all these maladies the Survey has given full coöperation within its sphere to the Public Health Service, as well as to local health and sanitational agencies, both state and municipal.

To the reader who has followed the history of the growth of the Survey and its activities thus far, there is one thing that must stand out with arresting prominence. That one thing is the graphic illustration it furnishes, in the development of the control of predatory and noxious animals, of what may be termed the inevitability of economics. Starting from nothing at about the beginning of the present century, when, as we have seen, the word "economic" was not the most popular word in governmental biological circles, that control has grown, in a quarter-century, into what is far-and-away the biggest part of the job the Survey does to-day. The economics of farming and of the tending of flocks and herds, has brought this to pass. It has constituted a force that could no more be withstood than the force that pulls the tides.

²² That is to say, it has principally. It is also spread to some extent by jack rabbits, snowshoe rabbits, and squirrels.

The change in emphasis that has come about is strikingly illustrated by the figures of the appropriations for the Survey for the fiscal year 1929. The total appropriation is \$1,165,000.²³ Of this total \$662,000 goes for avowedly purely economic work.²⁴ More than half of that work, by a considerable margin, consists of the control of predatory and noxious animals, and more than half of the total appropriation for that work, by a like considerable margin, goes for the financing of that control. Contrast with these figures the total for biological investigations,²⁵ \$45,000, or even the total of the next largest appropriation for economic investigations, \$163,000,²⁶ bearing in mind at the same time that this next largest appropriation is one for purposes well-nigh as purely economic as the killing of coyotes and gophers,²⁷ and the conclusion is inevitable and overwhelming that the Biological Survey, as of the year 1928, is an economic organization, an organization whose outstanding purpose makes Mr. Henshaw's declaration of 1908—"In its aims and ambitions this is a practical age"—even more pointedly true for to-day than it was for the day it was uttered.

But before we pass from this phase of the story, a word of warning. The over-bulking bigness of the economic features of to-day must not be allowed to make us patronizingly tolerant of the "purely biological features of the work"—to paraphrase slightly Dr. Merriam's plaint of 1888. And this for a very solid economic reason. As a result of the zone establishing work of 1886-1907 the Survey knows its geographic distribution. It knows where noxious rodents of the various species are, and where they are not.²⁸ It is enabled in consequence to view the problem presented

²³ Exclusive of \$200,000 appropriated under the Second Deficiency act of May 29, 1928, for Bear River Refuge.

²⁴ That is, for food-habits investigations, fur-bearing animal experiments, predatory and noxious animal work, and rabies suppression.

²⁵ For geographic distribution work and the preparation of maps of the life zones.

²⁶ For the enforcement of laws for the protection of game.

²⁷ Similar comment applies to the third and fourth largest items in the appropriation: \$100,000 for furthering the reindeer industry in Alaska, and \$99,000 for the maintenance of the game reservations.

²⁸ As illustrating the difference between certainty and guess work in this respect, Dr. Merriam stated in 1908 that the game laws of certain states used to mention species that did not occur in them at all. See House Hearings on Agricultural appropriation bill, 1909, pp. 528-63.

by the ravages of any particular rodent in its entirety instead of piecemeal. This is a great advantage. Thus has the purely scientific work of the past laid an enduring foundation for the purely economic work of the present.

The Lacey Act and Developments Thereunder. Reference has been made hereinbefore to some remarks made by Dr. Merriam in 1886 regarding the danger lurking in the unrestricted and ill-considered introduction of various birds and animals into new surroundings. In the course of those remarks it was stated that

The great calamity that has befallen our agricultural industries in the importation of the English sparrow, and the threatening danger from the introduction of the European Rabbit, should serve as timely warnings to an intelligent people and lead to legislation restricting the importation of foreign birds and mammals.

It seems desirable that a law be enacted conferring upon the Commissioner of Agriculture the power of granting or withholding permits for the importation of birds or mammals, except in the case of domesticated species, certain song and cage birds (to be specifically enumerated), and species intended for exhibition in zoological gardens, menageries and museums, which may be brought in without special permits.

The question of the desirability of importing species of known beneficial qualities in other lands is one which sooner or later must force itself upon our notice; and it is highly important that when such experiments are made they should be conducted by or under the control of the Department of Agriculture. And it may be suggested that isolated areas, such as islands of suitable size and character, be selected for this purpose, so that the spread of the species may be prevented if the result renders this course desirable.²⁹

The careful student of the records and literature of ornithology and mammalogy for the following decade of the nineties cannot fail to note certain significant occurrences indicative of a widespread growth of realization of the soundness of Dr. Merriam's contentions. Certain of the British colonies began to take note of the unpleasant results which had flowed from the early enthusiasm in Australia and New Zealand for the introduction and establishment of various birds and animals from "home." Cape Colony shut out the English rabbit in 1890; and three years later Western Australia passed the famous "Destructive Birds and Animals

²⁹ Department of Agriculture, Annual Report, 1886, p. 258.

Act,"³⁰ under which were forbidden the importation, possession, or liberation of birds or animals which, in the opinion of the Governor-in-Council were undesirable. Great flexibility was given to this law by providing for a sliding list of forbidden importations, and for the basing of the prohibitions of the Governor-in-Council upon recommendations of the colonial bureau of agriculture, which thus became, in effect, the absolute excluding power.

In our own land the quarantine officer of the California State Board of Horticulture, in 1896, strongly urged a national law regulating bird and animal importations. California at that time was the only state which was taking a determined stand upon the question. It had been forced to do so by considerations of the utmost urgency with respect to its economic safety. Trans-Pacific commerce, nine-tenths of which converged in San Francisco Bay, constituted a dire threat to its enormous horticultural resources, because it created a bridge from the Orient and from Hawaii over which there was constant danger of the inflow of certain exotic species of birds and mammals which, once thoroughly established, would be ruinous to those resources. The nation placed no guard at the bridge head. California, therefore, was forced to place one of its own. First it created a state board of horticulture by an act passed March 13, 1883,³¹ and then, on August 15, 1894, it adopted stringent quarantine regulations under its authority. Number XII of those regulations prohibited the landing of flying foxes, Australian wild rabbits, mongooses, and other creatures of dangerous possibilities, and authorized their destruction if landed. To the strict enforcement of these regulations by California over a period of years, America can in all probability attribute her present freedom from the mongoose curse. These creatures had been introduced into Hawaii years before for the purpose of exterminating rats. They had quickly overrun the islands, and finally became a pest of such virulence³² that the people who had brought them in were forced to turn their hands against them. They would unquestionably have invaded America via California had it not been for the determined vigilance of that state.

³⁰ 57 Vict., 22.

³¹ Amended March 8, 1889.

³² Principally in the way of destroying native Hawaiian birds, and their eggs and young.

Emphasis is placed upon the attitude of California by a concurrent happening in an adjoining state. In Oregon, where the fruit-growing industry was in no way comparable to that in California, either absolutely or relatively, there was in existence at that time, and had been for several years, a society whose sole object was the introduction and establishment of certain foreign birds. The Society for the Introduction of European Song Birds, of Portland, spent some \$2000 in 1892 for the importation of a considerable number of European birds, mostly skylarks, linnets, thrushes, and starlings. This importation, like one made by the same society in 1888, was made for purely sentimental reasons, and with slight consideration of the fact that birds, harmless enough in their native haunts, are entirely likely to change their habits and become pestiferous in a new environment. At this very time the object lesson along these lines furnished by the introduction of the starling into New Zealand was a thing well known.

Similar comment might be made upon the large importations made in the seventies by another society of the same sort in the eastern part of the country, the Acclimatization Society of Cincinnati.

Another angle of the question from the fruit-growing standpoint was presented in 1898, when it began to be urged seriously by a large section of the industry itself that certain foreign birds be imported for the purpose of combating insect pests. At that time the codling moth was causing great losses to the fruit growers in the Pacific Coast region, particularly in Washington and Idaho; and the theory was advanced that the importation of the kohlmeise and blaumeise³³ from Europe, where they were said to eat this pest extensively, might be the means of its extinction, or at least of its control, in the badly infested regions of the Northwest.

This suggestion received no encouragement from the Division, to which many inquiries were directed by the Western fruit growers. Instead, it was pointed out that the destruction of the codling moth by these birds in Germany and elsewhere was not definitely known to be as extensive as reported; that the infested regions in the West already possessed several native titmice of the same genus; and finally that the usefulness of these birds in moth suppression in Europe, even if as great as reported, was by

³³ That is, the great titmouse and blue titmouse of Europe.

no means a guarantee of their similar usefulness in new and strange surroundings.

In the following year, 1899, a tragi-comic uproar of controversy over the bird which stood for America's classic blunder in wild life importation, the English sparrow, furnished the climax for the mounting interest in the whole subject of attempting to improve on nature for which the decade is notable. There existed at this time in Boston a society the objects of which were radically different from the objects of the societies in Portland and Cincinnati. The American Society of Bird Restorers gave no thought to the stocking of America with foreign birds, but it did give a great deal of thought to the matter of restoring native birds to the status they had enjoyed prior to the day the Hon. Nicholas Pike *et al* had conceived their epochal idea. Observing that the Common and the Public Garden were no longer the homes of great numbers of our lovely and melodious native birds, but were in effect avian ghettos, crammed with clamant, greedy, filthy, bickering clouds of a single alien species, the members of the society resolved on drastic measures to remedy the situation. So they petitioned the mayor to take action against the sparrows, under authority of a law passed in 1890; alleging, what was patently true, that the sparrows had become a public nuisance—that they had pre-empted all the nesting sites about the areas in question, that they were driving native birds away, and that they were messing up the surrounding buildings.

In response to this petition a force of men was set to work with ladders and poles destroying sparrow eggs and nests and blocking up all points of harborage they could find. In three weeks they had destroyed one thousand sparrow eggs and four thousand sparrow nests, and had sealed up five thousand holes. They killed none of the birds, as the Society's plan of campaign contemplated trapping them in the following winter and destroying them in various ways not involving the spreading of poison.

But in the midst of this most commendable action the work was abruptly terminated upon the order of the mayor. Such a terrific to-do had been set up by professional humanitarians and others of a like kidney that that gentleman could not withstand the pressure. It was unfortunate that this was so, as the experiment was not continued long enough to secure definite results or to test fairly

the procedure as a method of coping with the inordinate increase of an undesirable bird.

Nevertheless, great good flowed from the attempt. It attracted attention all over the country, as no other one thing had ever done, to the sparrow in particular and to imported pests in general. The measure of the extent to which it did this is illustrated by its effect upon the affairs of the then Division. It will be recalled that one of the very first bulletins the Division had published was one dealing with the "English Sparrow,"³⁴ and that it had appeared just ten years before the commotion in Boston occurred. The edition had been a large one, the result being that after the first flurry of interest in the new publication had died down a fairly sizeable block of left-overs reposed in the Division's stock room, and seemed fated to repose there forever. But the bird-nesting episode on Boston Common changed the forgotten publication into an eagerly sought one, literally overnight. The left-overs began to "move" almost immediately, and they were exhausted, and a long list of unfillable requests for copies piled up, before the work in Boston had rounded out its first week.

The foregoing significant incidents in the development of national thought upon this vital matter of bird and mammal importation during the decade of the nineties will furnish the reader with a background for a better understanding of a most important phase of certain noteworthy events, which, beginning in the first year of the present century, have made great advancement in the conservation of the desirable forms of American wild life, especially game, and are at this writing in process of making greater. In that decade of the nineties the frame of mind of the nation had worked around to a point where the unwisdom of such unrestricted importings was beginning to be understood in other circles than naturalistic ones. The time, therefore, was felt to be ripe for a determined move against it. All that was needed was an opening.

That opening was furnished opportunely during the last three years of the decade, when three different phases of the wild-life conservation movement received congressional furtherance at almost the same time. A Western congressman, long noted as

³⁴ It was the first in numeration, being Bulletin No. 1, but the bulletin on bird migration beat it to publication by about a year.

a game bird enthusiast, proposed to give the United States Fish Commission jurisdiction over game birds, and to have the government, through the instrumentality so created, engage in, among other things, the restocking of depleted covers, the establishment of game birds peculiar to certain sections of the country in other sections favorable to their thriving, and the importation of game birds from foreign lands.³⁵ On the day following the introduction of the bill embodying these proposals, another bill was introduced by Senator Teller, of Colorado, designed to prevent the illegal export of big game from Colorado, Utah, and Wyoming.³⁶ Later on in the same Congress Senator Hoar, of Massachusetts, aimed a bill at the traffic in bird plumage—both importations from abroad and interstate shipments.³⁷

None of these bills became law. But in the following Congress a new bill was introduced embodying all the vital features of the first two of them, a substantial portion of the third, and a fourth proposition as big, if not bigger, than any contained in the three original bills. That is to say, the new bill aimed to safeguard and improve the status of "game birds and other wild birds"; to suppress the killing of game as a business, popularly known as market hunting; to make more difficult the business of slaughtering various birds, game and non-game, for their plumage;³⁸ and, finally, to regulate the introduction into the country of all exotic species of birds and animals, and rigidly to exclude all such birds and animals known to be dangerous or undesirable. All the proposed activities were to be performed by the Department of Agriculture. The new bill encountered no serious opposition, and went to passage May 25, 1900 (31 Stat. L., 187). It has come to be known universally as the Lacey Act, although, as the reader will observe, it goes the original bill of that name several better by the inclusion of a number of features with which the proponent had not at first been particularly concerned. In short, it "blan-

³⁵ 55 Cong. 2 sess., H. R. 3589. The original Lacey bill.

³⁶ 55 Cong. 1 sess., S. 2329; 55 Cong. 2 sess., S. 3257. The shipping of big game out of these states had developed into quite a "business," despite local laws designed to prevent it.

³⁷ 55 Cong. 2 sess., S. 4124.

³⁸ This feature, it will be noted, was not so sweeping as Senator Hoar's proposal in 55 Cong. 2 sess., S. 4124, which also aimed at importations of foreign plumage.

keted," so to speak, all of the then outstanding ideas for the halting of the squandering of American wild life, which was going on at the time without effectual restraint, plus the immensely important proposition which Dr. Merriam had advanced over a decade before looking to the exclusion of exotic forms of wild life dangerous to the existing American "balance." For these reasons a comparison at this point of the provisions of the act with those of the earlier bills will be instructive.

The objects of the original Lacey bill are as well, if not better, taken care of in the final act. That act provides for the safeguarding and improvement of the American situation with regard to "game birds and other wild birds,"³⁹ not only by the protection of distinctively American species and their wider distribution, but by the importation and propagation of similar and related species from other countries to the end that the range of game bird life in America may be enriched and enlarged.⁴⁰ The work, however, is not placed with the Fish Commission, as originally proposed; but with the Department of Agriculture.

The market hunting phase of the new act is hardly to be compared with the moderate gesture made in that direction by the Teller bill in 1897. That bill was merely local in scope, or at best regional. But the new Lacey Act outlawed the commercialization of game from one end of the country to the other. Moreover, it made that outlawing much more than a mere *thou-shalt-not* pronunciamiento by tying it up securely to the interstate commerce clause of the Constitution; thereby putting the market hunter not merely in a

³⁹ This language is broad enough to include everything in feathers apart from domestic, or "barnyard," fowl. But the birds which the originator of the idea had principally in mind were such birds as pheasants, partridges, prairie chickens, wild turkeys, etc., the sort roughly generalized by the expression "upland game birds," as distinguished from migratory water fowl and shore birds.

⁴⁰ This was no new idea. Several varieties of the gorgeous pheasant life of Mongolia were very successfully introduced into Oregon in the early eighties. See, in this connection, the article on "Introduced Pheasants" in the "Report of the Ornithologist and Mammalogist" in Commissioner of Agriculture, Annual Report, 1888, pp. 484-88. English pheasants had been introduced into Georgia in 1887. Still earlier, various American species had been successfully established in parts of the country in which they had not theretofore existed. The California Valley quail were "planted" in Washington Territory in 1857; and "Bob White" quail were established in Idaho in 1875. All these projects had been carried through under private or state auspices or a combination of the two.

legal hole but in an exceeding practical one, as will presently be made apparent.

There were by the year 1900 a not inconsiderable number of states in which it was contrary to law to kill game for any purpose during close seasons—the said seasons varying with the states as to length and species protected. Likewise there had come to be many states out of which it was contrary to state law to export game killed within their borders. There again, the laws varied with the states. In some states all exportations of game were forbidden at all times. In others the prohibition reached only certain varieties at certain seasons or for certain purposes. There had been a slow but unmistakable drift toward the non-export device in state game legislation for nearly half a century,⁴¹ and out of that drift there gradually crystallized the—for America—new proposition that all game belongs to the state. The idea in its years of development had its ups and downs. Thus, in 1876, Kansas had forbidden the shipping of protected birds or animals extra-state, only to have the state supreme court declare the prohibition unconstitutional the following year.⁴² Two years later, however, Indiana passed a strict non-export law; and in 1881 what is said to have been the first enunciation in an American decision of the old common law principle that game belongs to the state was made in a case in Illinois⁴³ involving the right of the state to legislate concerning game imported within its borders. In 1896 the proposition reached the United States Supreme Court,⁴⁴ and its constitutionality was upheld, the decision declaring in effect that a state owns its game and can prohibit its export.

The effects of this decision were immediate and far-reaching, clearing the way as it did for the unrestricted spread of a new viewpoint which had been developing through the years with the growth of national experience and necessity. By 1899 it had resulted in the restriction or the prohibition of the export of game in more than half the states. That it exerted a definite pull upon the country toward the principles finally adopted in the Lacey Act is well illustrated by two statutes enacted in that same year. One

⁴¹ Exportation of deer hides had been prohibited in colonial times.

⁴² *State v. Saunders*, 19 Kansas 127.

⁴³ *Magner v. People*, 97 Illinois 320.

⁴⁴ *Geer v. Connecticut*, 161 U. S. 519.

of these, an Indiana statute, authorized the officers of other states to seize in Indiana game illegally shipped from their own states. And a Wisconsin statute went further. It not only authorized similar seizures in Wisconsin, but made the game officers of all other states *ex-officio* agents of Wisconsin for the expediting of such seizures. Further, it required that all packages of game or fish shipped in Wisconsin should be plainly marked, not only as to contents but also as to the name and address of the shipper. Colorado, likewise, required the marking of game packages by an act passed in that same year.

In addition to the two tendencies just discussed there was another in process of development about this time which was even more directly an outgrowth of the reaction which the cynical callousness of market hunting had inevitably produced in the public mind; this was the proposal to strike at game commercialization by restricting the sale of the market hunter's spoils. It was coming to be increasingly evident everywhere that the real problem presented by the diminishing game supply was not so much the result of the activities of the sportsman as of those of the man who killed game by the wholesale to peddle it to the innkeeper and the epicure. As a result of this feeling, laws prohibiting the killing of game for sale began to make their appearance, and in 1894 the revolutionary proposal was put forth that the sale of game be prohibited at all times.⁴⁵ In the following year Michigan passed such a law regarding the sale of quail, partridge, and woodcock. In 1897 Montana prohibited the sale of all protected game. In a review of the entire situation as regarded game birds written in 1899 it was declared that the principal causes of the decrease in the numbers of such birds were spring-shooting, the cold-storage traffic, and sales in close seasons.⁴⁶ It is scarcely necessary to point out that all these things were by their very nature intimately tied up with market hunting.

But all these developments, significant as they were of the trend which economic pressure, reinforced by enlightening conservational sentiment, was pushing forward, were, merely of themselves, of comparatively little direct practical effect upon the abuse they

⁴⁵ *Forest and Stream*, XLII, 89, 111, 115; February, 1894.

⁴⁶ "A Review of Economic Ornithology in the United States," Yearbook, 1899, pp. 258-92.

sought to combat as a whole. There was still a large and unrestricted market for game to which it was exceedingly profitable to cater. Even where sale restrictions existed, such things as a lack of determined public interest, local lack of sympathy with the broad theory of game protection, and the temptation inherent in "easy money," frequently conspired to make a joke of enforcement. And, restrictions or no restrictions, it was generally comparatively easy for hardy and resourceful crookedness to dispose of game once it got it to the locality of demand. And getting it there was an operation of the simplest, despite state non-export laws. The railroads and express companies were engaged in interstate commerce. If they were given anything like a colorable excuse for regarding a barrel of ducks as a barrel of potatoes, they would send the ducks along and pocket their tariff without asking a lot of fool questions. And once the ducks were over the state line Justice might twiddle her fingers."

An altogether different situation was presented, however, when the Lacey Act came along with the interstate commerce clause club in its hand and mounted guard at every freight and express office in the country. The game shipper discovered that it was no longer possible to start his "goods" toward their destination with practically no questions asked. He was coldly received where formerly he had been welcome. His business was not sought, and he had to go to great lengths to establish its legitimacy before it was accepted. His name and address had to go on his shipments, together with a description of their contents, and the transportation companies as a general thing wanted more evidence as to the nature of the contents than his naked statement. For the companies were now equally liable with the shippers in matters involving the exportation of game, and they were not looking for trouble. Furthermore, the consignee was also liable; so that retribution had a chance at market hunting, one might say, going, coming, and in-between. The game shipper could only start his shipments legally when the local law at the starting point did not forbid its killing. But even then he had a possible hazard to get around. As soon as the shipment got within the jurisdiction of its destination, it was just as

"With the Indiana and Wisconsin exceptions above noted. Elsewhere smuggled-out game was regarded as an article of interstate commerce with which a state might not interfere.

subject to the laws of that jurisdiction as though it had originated therein, and if those laws forbade sale or possession it was liable to confiscation emphasized with a fine.

What has been said above about the Lacey Act putting the market hunter in a very practical hole will now be entirely understandable. As a matter of fact, it constituted a practical problem for the "profession" of the first magnitude. There was no getting around it on a scale sufficiently extensive to make it worth the while in the organized, big business sense of the past; and, with popular sentiment throughout the country tending in the direction it was, the beginning of the end of market hunting may be said to have set in with the law's enactment. All that remained to be done was the closing up of local loop holes here and there by the enactment of local laws covering close seasons, exportation, sale, and possession. And that the temper of the times made it inevitable that this should come to pass, has already been made plain. National experience plus national necessity in the matter of game had run sufficiently far by 1900 to bring about national action, the object of the said action being

to enable the States by their local laws to exercise a power over the preservation of game and song birds, which without that legislation,⁴⁸ they could not exert.⁴⁹

A careful pondering of the just-quoted judicial utterance is commended to the reader. It is an excellent statement of the frequently-missed point that the Lacey Act is auxiliary or supplementary, as regards its game traffic and plumage traffic features, rather than direct. It does not aim to strike those traffics immediately and of itself. It aims so to adjust the potent interstate commerce clause that the states may be enabled to do that striking for themselves.

As has already been stated the Lacey Act did not go so far, comparatively speaking, in the matter of the combating of the traffic in bird plumage as it did in game bird distribution and propagation and in the abolishment of market hunting. No particular effort was made to get the provisions of the Hoar bill inserted in the act, and for the time being effort for the adoption of the rather drastic

⁴⁸ That is, the Lacey Act.

⁴⁹ *People of State of New York ex. rel. Hill and Silz v. Hesterberg*, 184 N. Y. 126.

procedure contemplated by that bill became quiescent. The author of that bill had recently secured the passage of a bill in his home state under which even the wearing of plumage, wherever it might have originated, was illegal.⁵⁰ He was content with the advantage gained in that victory and with the improvement in the national situation with regard to the plumage traffic which the provisions of the Lacey Act covering transportation in interstate commerce brought about. For, it need hardly be pointed out, the practical pit which those provisions dugged for the shipper of game was equally difficult of negotiation for the shipper of birds, or parts of birds, destined for the embellishment of the headgear of ladies or supreme grand commanders. Likewise, the provisions of the act making the law of the ultimate jurisdiction supreme as to possession or storage, regardless of the jurisdiction of origination, hit the plumage dealer fully as hard as it did the game dealer. In a way it hit him harder, for though state laws forbidding the killing of non-game birds—from which birds fully 90 per cent of the plumage of commerce was derived—cannot be said to have been more generally existent in 1900 than similar laws restricting or prohibiting the killing of game birds, the tide of resentment running against the plumage traffic was even deeper and stronger than the one that had set in against market hunting. More than that, it had more uniformity and organization to it—an organization that was somewhat closely related to the then Division by reason of the fact that it and the Division had a common source.

The reader will recall that the American Ornithologists' Union came into existence in 1883, and that the Division of Economic Ornithology and Mammalogy was the direct result, two years later, of the bird migration studies started by the Union on a scale out of proportion to its strength. Naturally, such an organization as the Union could not be indifferent to the existence of a business that had thriven for years through the cold-blooded and wantonly wasteful destruction of some of the most beautiful forms of American bird life, and which, at the time the Union was formed out of the Nuttall Ornithological Club, was just about at the hey-day of its sorry prosperity. In the very year the Union was organ-

⁵⁰ Provided, that is, it was the plumage of birds occurring in Massachusetts. It did not apply, for instance, to the plumes of the bird of paradise.

ized, forty thousand terns are said to have been killed around Cape Cod. On the New Jersey coast in the same season, terns were practically exterminated. All along the Atlantic and Gulf coasts, and to a lesser extent along the coasts of California, Oregon, and Washington, the systematic hunting of herons, ibises, terns, egrets, roseate spoonbills, and other non-game birds of fine plumage was going forward. The slaughter was at its worst in the heronries and rookeries about Florida, where regular forces of salaried gunners were maintained by dealers, and whence local "contractors" annually shipped enormous numbers of plume birds to the centers of the traffic. All this despite the fact that Florida had had a law protecting plume birds since 1877.

Far from being indifferent to these things, the newly-formed society of ornithologists was very keenly interested in them. In its membership were men who had investigated the abuse and were thoroughly informed regarding the forces and influences back of it, and their strength and weakness; as well as regarding the extent of the damage to bird life which that abuse was inflicting. It is not putting it too strongly to say that a desire on the part of ornithologists to get the opposition to this abuse organized, was an influence moving the formation of the Union. To be sure, it was a minor influence. The major ones we have already noted. Nevertheless, it was strong enough to bring about a formal protest by the Union regarding the plumage traffic, and the formation of a committee on "the protection of North American birds" in the second year of the Union's existence; which committee two years later drew up and published the "Act for the Protection of Birds," with the intent that it be used by state legislatures in the preparation of protective legislation. This "A. O. U. model law," as it has come to be commonly known, limited game birds to the anatidæ,⁵¹ rallidæ,⁵² limicolæ,⁵³ and gallinæ,⁵⁴ and prohibited the killing at all times of all other birds.⁵⁵ New York adopted it the year of its publication, Pennsylvania three years later, and Indiana in 1891. New

⁵¹ Ducks, geese, swans, etc.

⁵² Rails, gallinules, coots, etc.

⁵³ Plover, snipes, oyster-catchers, etc.

⁵⁴ Wild turkeys, pheasants, partridges, prairie chickens, etc.

⁵⁵ Except that specimens might be collected for scientific purposes, and that the English sparrow might be killed at all times.

Jersey, Florida, Texas, and Wisconsin already possessed laws either protecting plume birds directly or forbidding the killing of birds for millinery purposes. California, in 1895, put a millinery provision in the game laws, and in Massachusetts in 1897 the wearing of plumage was forbidden, as related hitherto.

And in addition to these phases of the trend against plume bird exploitation, there are certain others that should be noted here. There was, for example, that formation of the popular society of bird lovers, the Audubon Society, in 1886, "for the protection of wild birds and their eggs." There was the formation a year later of the Boone and Crockett Club, an organization that was at first purely social in its objects, but very shortly developed into a militant organization in the cause of wild life conservation in general. Finally, there was the great development and the wide spreading of the ideals of sportsmanship; and that growth in understanding of the real significance, in a practical as well as in an ideal sense, of the "Balance of Nature," out of which evolved the institution of Bird Day in 1894, destined to attain in a few years an educational importance as great as that of Arbor Day. The objects of the League of American Sportsmen, organized in 1898, were the urging of better enforcement of the game laws, and the protection of song and insectivorous birds. The League is said to have played an important part in the passage of the Lacey Act.

It will thus be seen that by the time the Lacey Act was passed a not inconsiderable amount of state legislation designed to protect birds of plume was in force and available as a basis for the operation of the national law; and that a very substantial proportion of this legislation was the direct work of an organization that was, as we have learned heretofore, closely related to the governmental unit upon which the enforcement of that national law was certain to devolve.⁵⁴ At no other point, indeed, in the entire history of the growth of national governmental activity in America in connection with wild life is there a clearer illustration of the way that activity has evolved out of private interest; which private interest,

⁵⁴ The Lacey Act names the Department of Agriculture as the instrument for its carrying-out. In the nature of things, the Division of Biological Survey, of that Department, was not merely the logical, but the inevitable agency for the actual performance of this new agricultural activity.

in turn, has evolved out of the gradual growth of America away from pioneer conditions of existence into those representative of stable and settled society. The act, in short, despite the fact that it did not interfere with the importation of plumage from abroad, as the original Hoar bill had proposed to do, nevertheless represented the longest step yet taken in America, if not in the world, toward the conservation of non-game birds, and the outlawing of a heartless business that has but one thing to its credit.⁵⁷ Of course it goes without saying that the enforceableness of the act on the plumage side was not made any stronger by the existing situation respecting the importation of plumes from without the United States. So long as that could be done, considerable latitude was bound to exist for getting around the law with plumes originating in the United States. That was a defect that time was destined to wipe out, as we shall see.

There remains to notice only that feature of the act not founded upon any recently proposed piece of legislation. No bill proposing the exclusion or the regulation of the importation of birds and animals had been contemporaneous with the Lacey, Hoar, and Teller bills. Nevertheless, when the gist of those three bills went to passage as parts of the Lacey Act, there went with them certain clauses embodying the essential features of the law Western Australia had devised to protect itself against avian and mammalogical dangers from without. Those clauses specifically excluded from the United States the mongoose, the fruit bat, the starling⁵⁸ and the

⁵⁷ If credit can be given for good resulting from an economic situation created by evil. Ostrich farming, a thoroughly desirable industry, which has attained some success in California and Florida, would never have become established in America but for the demand created by the plume traffic.

⁵⁸ The European starling (*Sturnus vulgaris*) stands next to the English sparrow as a concrete example, in the realm of ornithology, of the lamentable results of the years of the ascendancy of that mawkish philosophy that bleated that America had room for everybody and everything. This bird gained a foothold here in 1890, after several prior attempts to introduce it had been unsuccessful. Its ever-extending range now covers the greater part of the eastern-central region. It was established in Portland, Oregon, in 1899 (see Annual Report, 1899, p. 68) but is now said not to have thriven there. So far it has not become as pestiferous here as it has in New Zealand. In moderate numbers it has not proved particularly harmful, as its food habits have been demonstrated to average beneficial or neutral. Unfortunately it has a flocking tendency, and in numbers it can be depended upon to injure orchards and gardens, establish offensive roosts, and drive all native birds away.

English sparrow, and empowered the Secretary of Agriculture to exclude any other birds or animals whenever the interest of agriculture or horticulture made such action desirable. They made a special permit from the Department of Agriculture a *sine qua non* to the importation of any bird or animal the entry of which was sought for other than approved museum or scientific purposes, or that did not fall within a category declared to be harmless by the Department's head. In a word, what amounted to the absolute "say" as to what creatures should enter and what should not was given to the Department of Agriculture. The actual physical execution of that authority, however, the St. Petering of it, was properly given to the Treasury Department, which, through its Customs Service, was already on guard at the various ports of entry.

It has been pointed out hitherto that the wild life activities of the government had resolved themselves, by about the beginning of the present century, into the two practical lines of the repression of the undesirable and the encouragement of the desirable. A better illustration of that resolving than the Lacey Act could scarcely be imagined. It is the positive expression, in legislative phraseology, of those two things, and those two only. That circumstance alone is sufficient to give this act the character of a truly outstanding piece of legislation. But that circumstance is not the only one, nor is it the most important one, that tends to make this act unique. The Lacey Act can boast the unusual distinction of being a statute that was passed by being beaten.

There is quite a story of inside congressional mill-grinding back of that statement, and it is a good one, but unfortunately the time for its general telling is not yet. But there is no harm in pointing out to the reader certain things in the record which are not lacking in significance. These he may consider, and appraise as he sees fit.

To some of these things his attention has already been drawn; for example, the fact that three features were proposed for enactment in 1897-1899 and four were enacted in 1900; in which general connection it is interesting to note certain occurrences of the period in between. The ink on the three original bills was hardly dry before there appeared the proposition, variously expressed, that the time had come for the national control of animal and bird importations. The Yearbook for 1898 contained a comprehensive article

on the subject written by the then-Acting-Chief of the Division.⁶⁰ Therein, Dr. Merriam's utterances of 1886 were quoted with approval, and the passage of a national exclusion law was strongly urged, the general administration of the said law to be under the control of the Department of Agriculture. The Divisional report for the following year⁶¹ was even more emphatic. It set forth graphically the crisis which unrestricted importation was bringing to a head, and spoke commendingly of the "Destructive Birds and Animals Act." Its first and concluding paragraphs upon the subject are, in part, as follows:

Thirteen years ago attention was called to the necessity of restricting the indiscriminate importation of mammals and birds, and the recommendation was made that the introduction of exotic species should be placed under the control of the Department of Agriculture. . . .

* * * *

In view of the immediate danger of the introduction of the mongoose and the desire now manifested to import several birds of doubtful value, I desire to renew the recommendation that the introduction of exotic animals and birds be placed under the control of this Department.

Again, there is the matter of just why the act was finally passed—of just what the great and outstanding reason for it was. The writer feels certain that at least eight out of ten persons of the man-in-the-street type, to whom the question might be put, would declare that its primary object was the suppression of market hunting. And in view of the fact that three of the features of the final act had been previously proposed to be enacted into law, whereas the fourth feature had not; and in view of the further fact that all of these three features previously proposed for enactment had behind them the cumulative force of the wild life knowledge which the nation had been gaining slowly, and sometimes painfully, ever since 1607, whereas the fourth feature had behind it only knowledge accumulated since 1850;⁶² in view of all these things the conclusion that the feature, or group of features, pressed

⁶⁰ "The Danger of Introducing Noxious Animals and Birds," by T. S. Palmer, pp. 87-111.

⁶¹ Biological Survey, Annual Report, 1899, pp. 67-68.

⁶² The sparrow year.

forward by overwhelmingly the greater force constituted the outstanding reason just referred to, would seem to be irresistible. And yet, in the Divisional report for the year following the passage of the Lacey Act, we are told that

The law has accomplished the main object for which it was enacted, namely, the exclusion of the mongoose and similar pests.⁶³

Somehow, there is something about this strikingly contradictory dénouement that suggests the old fable of the ass and the terrier at the river bank. Both wanted to cross. The ass could swim. The terrier could not; and proposed to ride over on the back of the ass. The ass was firm in his reprobation of any such trenching upon his dignity until it was made plain to him that unless both got over, neither would.

The final enactment of the Lacey Act may be likened to a breaking through the last stretches of a tangled jungle and morass to firm footing and open, unobstructed going. Through three centuries of varying stages of free and easy, every-man-for-himselfism that is inevitably a part of the vast operation of wilderness conquest, inasmuch as it is the very motive power of that operation, America moved by slow degrees relentlessly toward more centralized standards of wild life control as experience accumulated and necessity demanded; which is only another way of saying as economic exigency dictated. Local control, colonial control, state control, regional control⁶⁴—all these theories developed and contributed their several influences toward national control, which came in, as we have seen, with informative and research functions in 1885 and moved toward the regulational ones embodied in the great act of 1900. With the why of the passage of that act, we need not be greatly concerned. The important thing is that it did pass just as it did. The fortunateness of the tacking of the idea of exclusion to the ideas in the three original bills is a thing the importance of which can hardly be overestimated. Those three ideas, as we have seen, were bound to go through sooner or later. They were ripe for enactment in the late nineties. But exclusion, which was every whit as important in the long run, was not so ripe, and it might have been delayed for a long time but for the

⁶³ Biological Survey, Annual Report, 1901, p. 155.

⁶⁴ For example, the Teller bill.

"beating of the Lacey bill." As things turned out the legislation went through four-square and with a solid, united front broad enough to comprehend at least every variety of wild life problem that might develop. Legislation that was to come after was to represent merely an enlarging or broadening of the national authority along the general lines laid down in the Lacey Act. All legislation since the Lacey Act has been simply an extension of the broad principle underlying that act—national control; a principle given expression in that part of the act's title which declares its object to be "to enlarge the powers of the Department of Agriculture."

After the first appropriation for carrying the Lacey Act into effect was made in 1901, the Agricultural appropriation act of March 2 of that year (31 Stat L., 922, 932) carrying a small increase for the purpose, the first direct amplification came in the following year in the shape of the so-called "Egg Act" of June 3, 1902 (32 Stat. L., 285), the gist of which was provision for the authorization by the Secretary of Agriculture of importations of eggs of game birds for propagation purposes. Provision was likewise made for the formulation of the necessary rules and regulations by the same officer.

Importations of this sort had been banned since 1894, the tariff act passed on August 27 of that year (28 Stat. L., 509, 540), having so decreed. The prohibition had been strengthened by a proviso in the tariff act of July 24, 1897 (30 Stat. L., 151, 197).⁶⁵ The incongruity of the situation produced by the existence of this prohibition contemporaneous with the game bird clause of the Lacey Act did not long go unnoticed. It was speedily pointed out that game bird propagation could be encouraged to better effect if eggs could be brought in and converted into chicks on American covers. The "Egg Act" was a direct result of effort to remove this illogical legislative obstacle.

The writer is not prepared to go so far as to say that the obstacle itself was a direct result of the popular sentiment coming to a head

⁶⁵ The 1894 prohibition extended to the eggs of game birds only; that of 1897 to eggs of birds not used for food as well as to eggs of game birds. Inasmuch as almost all the birds being hunted at the time for their plumage were birds that were not used for food, the prohibition of the importation of their eggs was conceivably favorable to their conservation.

in the "Great Duck Egg Fake," but that their contemporaneousness is at least suggestive, an account of that high-powered pleasantries will make manifest.

The large-scale gathering of the eggs of such birds as gulls, terns, herons, murre, etc., for use as food had been going on at various points on the Atlantic and Pacific coasts, as well as on certain Pacific islands and in Alaska for many years. The operations of professional egggers are said to have exterminated gulls and terns near the mouth of Tampa Bay in the early eighties. A regularly organized company had a monopoly of eggging on the Farallone Islands for thirty years. These islands lie just off the Golden Gate, and are therefore conveniently adjacent to the San Francisco markets. The company was dispossessed by the lighthouse authorities in 1881, the Farallones being a lighthouse reservation; but this action did not end the abuse, as the light-keepers continued the eggging, per paid employees, till 1897. Protests to the Lighthouse Board by the American Ornithologists' Union and other interested organizations caused the promulgation of orders in December, 1896, forbidding further egg gathering.

In the course of time accounts of these commercialized activities, so enormously destructive to various forms of bird life, began to reach the public mind. They did not have to be exaggerated to be on a scale almost gargantuan,⁶⁶ and the result was that a two-fold reaction was produced. The public mind was shocked at the wastefulness disclosed, and it was keyed up to believe almost anything along egg lines that it was told. Thus it was that the "Great Duck Egg Fake" of the late nineties went over, almost, as the saying is, without a dissenting voice. The country was horrified and enraged to learn that the great summer nesting grounds of the migratory wild fowl in Alaska and the far north of Canada were being systematically ransacked by organized greed year after year to procure raw material for lollypops. It was alleged, and believed, that enormous numbers of eggs taken from the nests were shipped east over the transcontinental railroads to various points for manufacture into egg albumen, a substance indispensable to the confectioner. Somebody apparently was becoming a millionaire by exter-

⁶⁶ As to which, see the article on economic ornithology in the 1899 Year-book, pp. 258-92.

minating wild fowl at the source. It was a good story, splendidly told, but it had to be spoiled. The magazine *Forest and Stream* went to some trouble and expense to investigate.⁶⁷ The story was shown to be without a shred of truth. But before the exposé a state legislature had memorialized Congress to protect the eggs of the ducks of Alaska, and an attempt had been made in Congress to get through an appropriation of \$5000 to finance an investigation. Nevertheless, the scare may have had something to do with the enactment of a section of the law of June 6, 1900 (31 Stat. L., 332), forbidding the destruction, possession, or export of the eggs of cranes, ducks, brant, or geese in Alaska.⁶⁸

The year of the passage of the "Egg Act," 1902, is also notable for the enactment of an important game law for Alaska. This law, however, will be considered elsewhere.

Largely as a result of efforts of the American Ornithologists' Union the beginning was made in what was distinctly a new departure in governmental wild life policy in America, when the first national bird reservation was established by executive order, on March 14, 1903, at Pelican Island, off the Florida coast. It was new in that it marked the beginning of a policy of creation of refuges for various forms of wild life whereon the killing at any time of any useful or desirable form of wild life was forbidden by national law, and the conservation of desirable forms of wild life thus made the primary⁶⁹ object of the refuges.

The excesses of the plume traffic were responsible for the taking of this step. As before related, Florida had tried to protect the plume birds that nested and bred in such great numbers on her

⁶⁷ *Forest and Stream*, XLIV, 503-05.

⁶⁸ This act was a codification of all laws relating to Alaska. Section 463, relating to the eggs of wild fowl, was put in as amendment (by addition) to Chapter 12, Title 1, of the act of March 3, 1899 (30 Stat. L., 1253, 1279, 1281), which act was the Alaska Criminal Code, and Section 173 of which prohibited the killing of fur-bearing (not game) animals except under regulation of the Secretary of the Treasury.

⁶⁹ The Yellowstone National Park had been made a game refuge, in effect, by the act of May 7, 1894 (28 Stat. L., 73). But the protection of game in the Yellowstone was auxiliary to the primary purpose of the creation of that reservation. Protection of wild life was the actual *raison d'être* back of the setting-aside of Pelican Island and the refuges to come after it. The preservation of the Yellowstone area itself in its primitive condition was the primary purpose for the setting of that area aside.

coasts by special protective legislation looking to that end, but without noticeable success. Temptation was too great, local cupidity too strong, and enforcement effort too feeble. In 1901 the state strengthened the situation as far as formal law was concerned by adopting the model law of the American Ornithologists' Union, under which the killing of all birds other than game birds was prohibited at all times. This naturally simplified things somewhat for striking at the shipment of plumes from Florida in other parts of the country by means of the Lacey Act. The committee on bird protection of the Ornithologists' Union had coöperated to the extent of its influence in getting the model law enacted; and had put forth special effort for several years to insure protection for a colony of brown pelicans inhabiting Pelican Island, paying the greater part of the salary of a special warden for the island which the state had appointed at the Union's request. Even this degree of protection turning out to be inadequate, however, the Union and the then-Division, in coöperation, through the Department of Agriculture, requested the Department of the Interior to consent to the setting-aside of the island as a reservation for the protection of native birds under the administration of the Department of Agriculture. The request was granted and the reservation created as already described. A federal warden was appointed in place of the officer formally named by the State of Florida. As had been the case under the old arrangement, the bulk of the warden's salary was paid by the American Ornithologists' Union.

By 1906 six more refuges of this sort had been set aside by executive order in various parts of the country from among a number of rocky, agriculturally worthless islets included in the public domain.⁷⁰ Warden service was established upon all of them with the coöperation of the National Association of Audubon Societies,⁷¹ which organization also assumed the responsibility in connection with the warden's salary at Pelican Island formerly

⁷⁰ Two were on the Florida coast; one on the Louisiana coast; two in Lake Superior; one in a lake in North Dakota.

⁷¹ Not to be confused with the original Audubon Society of 1886 founded by *Forest and Stream*, which had gone out of existence in 1889 or 1890. For a good account of the Audubon movement, see Oldys in 1902 Yearbook, p. 207 *et seq.*, "Audubon Societies in Relation to the Farmer."

borne by the Ornithologists' Union.⁷² In order to make the protection of birds on these refuges more certain, Congress, by the act of June 28, 1906 (34 Stat. L., 536), made it a misdemeanor to disturb thereon birds or their eggs in any manner; or on any refuges thereafter to be established in which birds were specifically protected.⁷³

Besides these refuges for the particular protection of birds under the administration of the Survey, the period 1903-1906 witnessed the establishment of a couple of refuges for big game under the administration of the Department of the Interior and of the Forest Service. The first of these refuges was created to take care of a small band of dwarf elk which had been presented to the government by Miller and Lux, ranchmen, of Kern County, California, who had protected the animals on their ranch for a number of years. A clause inserted in the Agricultural appropriation act of March 3, 1903 (32 Stat. L., 1147, 1160, 1161), provided funds for the removal of the herd by the Biological Survey to an area within the Sequoia National Park, and for the fencing and other necessary preparation of that area. The area was designated by the Secretary of the Interior, and that department assumed the care of the animals after the transfer had been completed.

The other refuge for big game resulted from the act of January 24, 1905 (33 Stat. L., 614), authorizing the President to establish a game and bird refuge in the Wichita Forest Reserve in Oklahoma. Pursuant to this grant of authority the President, by proclamation of June 2, 1905, set aside the entire forest reserve area of sixty-one thousand five hundred acres as a game and bird refuge, thus giving it the double status of forest reserve and game preserve. An emergency appropriation included in the Agricultural appropriation act of June 30, 1906 (34 Stat. L., 660, 696), provided funds for the fencing by the Forest Service of some eight thousand acres of the refuge for the reception in the following year of a herd of buffalo presented to the United States by the New York Zoological Society, as well as for the erection of sheds and other

⁷² A change that was more apparent than real. The members of the A. O. U. Committee on Bird Protection and the officers of the National Association or Audubon Societies (organized in 1905) were the same persons. See *Bird Lore*, VII, 45-120.

⁷³ But note amendment to this law mentioned *infra*, p. 110.

buildings necessary for the proper care of these animals. The Forest Service has had full control of this great game preserve, including the buffalo range, ever since its establishment.⁷⁴

A few months after the first refuge was established on Pelican Island an attempt was made, by means of another Lacey bill,⁷⁵ it is interesting to note, to make game refuges of the then-existing forest reserves. It was proposed to give the President authority to set up such refuges at discretion, their administration to be under the Secretary of the Interior.⁷⁶ The bill, however, failed of passage.

The following year, 1904, is noteworthy for another wild life bill that failed of passage. This was the Shiras bill, of December 5, 1904,⁷⁷ entitled "A Bill To protect the migratory game birds of the United States." Although, like the first Lacey bill, it did not become law itself, it constituted, as had that bill, the original expression, legislatively, of a principle destined to crystallize into formal enactment with the running of a little more time, and the accumulation of a little more experience and necessity.

The principle mentioned can be best described by quoting from the bill itself, the preamble to which states that

Whereas experience has shown that laws passed by the States and Territories of the United States to protect game birds within their respective limits have proved insufficient to protect those kinds and classes of said birds which are migratory in their habits and which nest and hatch their young in States other than those in which they pass the usual hunting season and in some cases breed beyond the boundaries of the United States, . . . etc.

Following this there were whereased a number of other things, including the fact that certain public waters of the United States were outside state and territorial jurisdiction, and the fact that the lack of uniformity in local laws for the protection of migratory birds had resulted in immense destruction and threatened extinction. In

⁷⁴ For a history of the Wichita Preserve and an account of the wild life it contains, see Miscellaneous Circular No. 36, of the Department of Agriculture, entitled "The Wichita National Forest and Game Preserve," published May, 1925.

⁷⁵ 58 Cong. 3 sess., H. R. 8135, December 17, 1903. "A Bill To protect wild animals, birds, and fish on the forest reserves of the United States."

⁷⁶ At that time, 1903, the forest reserves were under the jurisdiction of the Department of the Interior.

⁷⁷ 58 Cong. 3 sess., H. R. 15601.

view of all which, it was proposed so to legislate that all migratory game birds that pass through and do not remain permanently in any one locality

shall hereafter be deemed to be within the custody and protection of the Government of the United States and shall not be destroyed or taken contrary to regulations hereinafter provided for.

In other words, it was proposed to so extend the underlying principles of the Lacey Act that the national government, with respect to a certain very important class of game birds, should take a direct hand in protection instead of merely aiding and abetting state efforts in that direction. A genuine national game law was aimed at, stopping at no state lines in the forbidding of certain forms of wild life destruction, uniformly, from end to end of the country.

For America such an idea was novel, not to say revolutionary; and the immediate adoption of it, legislatively, was out of the question. And yet, boiled down, it was a very simple and a very logical proposal—a proposal to fit a new adaptation to a new condition where the old adaptations were notoriously failing to work. The new condition was nothing more or less than the final coming to pass, by reason of the tipping of the scales from the primitive to the so-called civilized, of a state of affairs under which migratory wild fowl were getting less than an even break. Enormous as were their reproductive powers, the drains upon their increase and the handicaps placed in the way of the processes of that increase, were so much more enormous that they were commencing to wage a losing fight. A constantly growing horde of gunners was shooting at them everywhere; a constantly diminishing area of water, marsh, and shore lands suitable for their feeding, resting, and breeding was making their existence ever more precarious; and, finally, the states were failing to afford them sufficient protection, especially during the breeding season in the spring of the year. In a word, America's "inexhaustible" wild fowl were beginning to be exterminated. Intelligent hunters and sportsmen everywhere were coming to recognize this indubitable fact, and the Shiras bill may be said to be the first important expression of this recognition. It was an attempt to answer legislatively a question the mover of the bill asked two years after its rejection, in

the course of an article on the great principle involved in the bill. That question was

Does there exist a sovereign power in the national government capable of meeting a situation where experience shows that the States acting alone have been unable to afford relief?⁷⁸

The years intervening between the introduction of the Shiras bill and the flowering of its underlying idea into definite legislative enactment in 1913 are chiefly noteworthy from a wild life conservational standpoint for the codification of the federal penal laws by the act of March 4, 1909 (35 Stat. L., 1088, 1104, 1137, 1138). The important law of 1906 for the protection of birds and eggs on refuges was re-enacted in this code as Section 84;⁷⁹ and the Lacey Act, with the exception of Sections 1 and 5,⁸⁰ became Sections 241-44 thereof, its language being considerably strengthened and clarified in the process.⁸¹

With the exception of laws passed in 1908 and 1910 concerning Alaskan game, which will be discussed elsewhere, this period is otherwise chiefly noteworthy for legislation making possible extensions of the big game refuge idea, and the beginning by the Survey of regular work in the investigation of the problems connected with the new business of the rearing of fur-bearing animals. A clause in the miscellaneous section of the Agricultural appropriation act of May 23, 1908 (35 Stat. L., 251, 262, 267), authorized the creation by the President, out of unallotted lands on the Flat-head Indian Reservation in Montana, of a permanent national

⁷⁸ "The Federal Protection of Wildfowl," by George Shiras 3d; *Forest and Stream*, LXVII, 815-24, November 24, 1906.

⁷⁹ The year in which the act protecting birds on refuges was codified—1909—witnessed a flare-up of sentiment against the whole refuge idea which questioned the authority of the Executive to make withdrawals of public land for any such purpose. See "Correspondence Between Hon. F. W. Mondell, Chairman of the Committee on the Public Lands of the House of Representatives, and Dr. T. S. Palmer, relative to Executive Authority for the Reservation of Lands as Bird Reservations."—Govt. Printing Off., 1909.

⁸⁰ These sections were not worked into the code because they are merely declaratory.

⁸¹ For example, the Lacey Act proper is a trifle cloudy as to whether shipping in violation of local law constitutes a breach of the statute. The codification wipes out the uncertainty by stating transportation to be unlawful "where such animals or birds have been killed or shipped," etc.

bison range along the same general lines as the one established in the Wichita Game Preserve two years before,⁸² and appropriated funds for the necessary equipment. The American Bison Society⁸³ had offered to present the nation with a herd of at least fifty buffalo if provision were made for its care, and the clause just cited was in response to that offer. Additional appropriations in furtherance of the initiation of this project were made in the Agricultural appropriation act of March 4, 1909 (35 Stat. L., 1039, 1051), and the deficiency appropriation act of February 2, 1910 (36 Stat. L., 202, 215). Since 1909 appropriations for the "Montana National Bison Range and other reservations" have been regular, or standard, clauses in all agricultural appropriation acts. The refuge was originally designed to have an acreage of something over twelve thousand, near the town of Moiese; but a total of twenty thousand was authorized in the 1909 act above referred to. The bison were introduced into the range in October, 1910, after the completion of the necessary fencing and equipment.

The language of the 1909 appropriation act just quoted, providing for the protection and maintenance of "other reservations," was broad enough to take in all the bird refuges, and thus brought to an end the dependence of the Survey upon the National Association of Audubon Societies for warden service upon those areas.⁸⁴ This added grant of means was made particularly acceptable by a great increase in the number of bird refuges during the same fiscal year (1909). Thirty-five new refuges were created during this period, bringing the total number up to fifty-one; and two of the existing refuges in Florida were enlarged. It is noteworthy, likewise, that in this lot of new refuges were included the first ones established without the borders of the Continental United States; six being in Alaska, one in Porto Rico, and one in the

⁸² The new range, however, was to be administered by the Biological Survey.

⁸³ The American Bison Society was established December 12, 1905. Its primary purpose was the preservation of the American Bison, which was believed at that time to be headed toward extinction. Its presentation of the Montana Bison Range herd—secured from the estate of a Montana rancher who had protected it during his lifetime—was its first considerable achievement in its chosen field of activity. The Society's first concern is still the buffalo, but it has extended its interests to include the protection of American big game in general.

⁸⁴ Biological Survey, Annual Report, 1909, p. 23.

Hawaiian Islands. The latter consisting of a number of mid-Pacific islets scattered about within five degrees of latitude and twenty degrees of longitude, constituting one of the largest and most famous breeding colonies of sea birds in the world. One of the Alaskan refuges was of similar outstanding calibre. It comprised the great Yukon Delta region, the summer nesting grounds for enormous numbers of migratory wild fowl. Incidentally, it was one of the chief sources from which the egg albumen trust had drawn its raw material—according to the Duck Egg Fake.⁸⁵ Two of the refuges created with the United States proper, the Klamath and Malheur refuges in Oregon, were likewise of prime importance with regard to migratory wild fowl. They lay right on the course of the Pacific Coast spring and fall flights, and were resorted to by myriads of the birds every year for rest and food.

Congress was moved, in 1911, to take cognizance of an unfortunate situation which had existed in the Yellowstone region of Wyoming in severe winters for many years. The large elk herds of that region were wont to drift down into the lower levels in and around the Jackson Hole neighborhood as the snow in the higher altitudes added to the difficulties of obtaining forage. Hard winters, with much snow and extreme cold, invariably meant a heavy mortality, for there was not sufficient public domain grazing in the Hole and vicinity to carry them over to spring. The State of Wyoming, through its game officers, began to feed the animals in 1909, and continued to do so thereafter at times of abnormal suffering; but the task being a strain on the state resources, and because of the undoubted interstate, or national, aspect of the problem, it ultimately asked assistance of the national government, with the result that a clause was inserted in the Agricultural appropriation act of March 4, 1911 (36 Stat. L., 1235, 1257, 1258), making \$20,000 immediately available for assistance in the work. It was at first intended merely to supplement the work which had been done by local and state effort as a sort of temporary or occasional matter; but a study of the situation disclosing that the descents of the elk into the lowlands of the Hole were practically an annual affair—they only remaining in the hills during the rare winter of abnormal mildness—a more permanent policy was determined upon.

⁸⁵ This refuge was abandoned in 1922 because it was found to be "too large for effective protection."

It was recognized that the establishment of a winter refuge for the elk at the point to which they had been in the habit of resorting under the urging of cold and hunger for no one knew how many years, was of prime importance for two reasons. In the first place it would preserve the southern herds of the Yellowstone elk from probable extinction; in the second, it would furnish the nation with an inexhaustible reservoir of animals for stocking purposes in all parts of the country, it being a very simple matter to round up and capture the elk when they appeared at the Hole almost literally begging to be fed. Congress, therefore, felt constrained to appropriate \$45,000 in the Agricultural appropriation act of August 10, 1912 (37 Stat. L., 269, 292, 293), for the establishment of a "winter game (elk) reserve" in Wyoming, the money to be expended for the purchase of some two thousand acres of improved ranch lands lying in that part of the Hole principally resorted to by the elk on their annual visits. And in the Agricultural appropriation act of March 4, 1913 (37 Stat. L., 828, 847), the Secretary of Agriculture was authorized to supplement the purchased areas by the addition of some one thousand acres of the public domain lying adjacent thereto. An additional appropriation of \$5000 was made in the same act.

By virtue of these authorizations a total of 1760 acres with equipment and improvements was purchased by 1916, and one thousand acres of the public domain were set aside. The total area was fenced, a permanent warden placed in charge, and preparations were made for the growing of hay, for which the entire area was suitable.

In addition to authorizing the establishment of the elk refuge, the act of August 10, 1912, authorized the establishment of the Wind Cave National Game Preserve on the land embraced within the boundaries of the national park of the same name located in South Dakota, and on such adjacent lands as the Secretary of Agriculture might see fit to acquire by purchase or condemnation for the purpose of securing an adequate water supply. The primary reason for the establishment of this refuge was to provide a range for another herd of buffalo presented by the American Bison Society. The refuge was designed, however, for the reception of all other American game animals calculated to thrive in the locality.⁸⁸

⁸⁸ The Boone and Crockett Club gave the Preserve thirteen antelope in 1915.

In the same year the Niobrara Reservation was established. The Niobrara Bird Refuge had already been established—by executive order (No. 1461) of January 11, 1912—on the Old Fort Niobrara abandoned military reservation in Nebraska. A second executive order (No. 1642) was issued on November 14, 1912, setting aside an additional area from the abandoned military reservation; and the whole, while remaining a bird reservation, was established likewise as a big game reservation⁸⁷ for the reception of a small herd of buffalo, elk, and deer presented to the government, early in the same year, by J. W. Gilbert, of Friend, Nebraska. The reservation was fenced and equipped at the expense of the National Association of Audubon Societies and the citizens of Valentine, Nebraska, which adjoins the reservation. A warden was appointed, December 16, 1912. The reservation was further enlarged by executive order (No. 3256) of March 31, 1920.

Nine years of consideration of the migratory wild fowl situation as set forth in the Shiras bill of 1904⁸⁸—a consideration which unceasing agitation⁸⁹ did not permit to flag—brought Congress and the country to a point where remedial national legislation along the lines originally proposed was a possibility, and the Weeks-McLean bill, in all essential features a reiteration of the Shiras bill, ultimately became law as a part of the act of March 4, 1913 (37 Stat. L., 828, 846, 847, 848). This was the Agricultural appropriation act of that year, and the superimposing upon it of paragraphs proclaiming all migratory game and insec-

⁸⁷ The entire Fort Niobrara reservation area had been both a game and bird refuge actually, if not officially, since 1908. President Roosevelt in that year produced the substance if not the show of a refuge by the simple expedient of ordering the War Department to prevent hunting on the entire reservation of some 55,000 acres. As to the big game aspect, see Survey Report for 1916, p. 9.

⁸⁸ And in the Weeks bill of 1908. 60 Cong. 2 sess., H. R. 22888, introduced by Senator Weeks, of Massachusetts, which was substantially a re-introduction of the Shiras bill.

⁸⁹ In which agitation a leading part was taken by the American Game Protective Association, organized, September 25, 1911, as the American Game Protective and Propagation Association, very largely for the express purpose of pushing the idea back of the Shiras bill. Mr. Shiras was one of its organizers. Several of the best-known naturalists and sportsmen in the country were others. A fact rather significant of the genuineness of the reasons advanced for the viewing-with-alarm of the migratory bird situation, was the active participation in the organization of the Association of the leading manufacturers of sporting arms and ammunition.

tivorous birds to be within the custody and protection of the national authority, and deputizing the Department of Agriculture to make that proclaiming effectual, was a thing that was violently opposed and bitterly resented, as may easily be imagined. Here again, there is a very interesting story hidden away in the refinements of parliamentary chess which cannot yet be told. It must suffice to say that it was somewhat widely held that the national-control-of-migratory-birds idea was unconstitutional, and that its attachment to an appropriation act as a sort of trailer was, to say the least, improper, because it was not germane to the subject of the main act. An effort was made to repeal it⁹⁰ in the following year, but it did not make great progress. The first appropriation for its carrying-out was made in that same year, however, in the Agricultural appropriation act of June 30, 1914 (38 Stat. L., 415, 433).

It has been said of this original national migratory bird control act that it was "the most radical and advanced step in conservation that had ever been taken in this country up to that time." This may or may not be true, but if it was deserving of that exclusive distinction, it did not, in the opinion of the writer, long retain its primacy, for a proviso in the tariff act of October 3, 1913 (38 Stat. L., 114, 148), under Schedule N, paragraph 347, went it several better in forthright effect by forbidding absolutely the importation into the United States of feathers, plumes, or bird parts of any description other than those of ostriches or domestic fowl. The plumage feature of the Lacey Act and its later strengthening codification were thus brought up to the standard of stringency which had been envisaged in the Hoar bill of 1898. An exceedingly fortunate combination of circumstances made this outcome possible. To tell the entire story of its development and eventuation would take too long. We must, therefore, content ourselves with noting that at a time when a tariff bill was being furthered as a great and outstanding party measure, two senators, who were members of the party pushing the bill and whose votes were necessary to its enactment, found themselves in a singularly commanding position, inasmuch as they could with equal propriety support the bill in toto for party reasons, or wreck it in its most vital schedule for local reasons. In other words, they could exact

⁹⁰ That is, the migratory bird section of the appropriation act.

a price for their support—and they did. That price was the inclusion of the plumage proviso just referred to. It so happened that the senators were bird lovers.⁹¹

In 1914 the creation of the Sullys Hill Game Preserve in North Dakota rounded out the system of big game refuges under the management of the Biological Survey into its present-day status.⁹² The Agricultural appropriation act of June 30, 1914 (38 Stat. L., 415, 433), made provision for the fencing of the area embraced in Sullys Hill National Park and for its further necessary equipping for the reception of buffalo, elk, deer, antelope, and other big game animals, as they might be received. Other big game refuges have been created since Sullys Hill, but they are under the administration of other federal agencies, usually the Forest Service of the Department of Agriculture,⁹³ or the National Park Service of the Department of the Interior. A scattered few refuges for birds and small game are under the War Department, the Navy Department, and the Lighthouse Service and the Bureau of Fisheries of the Department of Commerce. A great number of game and bird refuges have been established by the states.⁹⁴ But the Sullys Hill Preserve is the last preserve for big game primarily to be created for administration by the Biological Survey along with the four previously-created ones: the National Bison Range,

⁹¹ It is not unlikely that the course of events culminating in the insertion of the non-importation clause in the 1913 tariff act was influenced to some extent by a particularly atrocious example of depredation which had occurred on two islands of the Hawaiian Islands reservation three years earlier. A revenue cutter captured gangs of Japanese poachers on those islands engaged in wholesale plume-hunting for shipment to Japan. They had been at work for some months when apprehended and had killed at least 250,000 birds.

⁹² That is to say, it did so far as the number of refuges is concerned. It did not as regards the total refuge area.

⁹³ The ideal sought in the Lacey bill of 1903 has not yet been attained, but since 1919 all hunting on all national forests has been considerably restricted. Forest Service Regulation T-7, effective October 1, 1919, forbids hunting on national forests contrary to the laws of the States in which the forests are situated. Regulation G-30 authorizes forest officers to enforce the foregoing both individually and in cooperation with local officers. As early as 1906 forest officers had been directed to assist local authorities in the protection of fish and game in "all practicable ways."

⁹⁴ A complete list of all game and bird refuges, state as well as federal, and a map showing the location of the federal ones in the Continental United States will be found in Appendix 6.

at Moiese,⁹⁵ Montana; the Winter Elk Refuge, at Jackson Hole, Wyoming; the Wind Cave Game Preserve, in Wind Cave National Park, South Dakota; and the Niobrara Reservation, at Valentine, Nebraska.⁹⁶

It will without doubt have been noted that certain points of similarity exist as regards the game preserves at Wichita, Wind Cave, and Sullys Hill, and certain other points of difference. They were all three created on national reservations already existing for other than wild life purposes; Wichita being a national forest, the other two, national parks. The creation of game preserves within their confines did not change their original status, but gave them an additional, or double, status. So far, all three are exactly similar.

But whereas in the case of Wichita the administration of the new activities arising under the new status was left in the hands of the governmental agency already in charge of the old one, an altogether different procedure was adopted in the case of Wind Cave and Sullys Hill. They continue to be national parks, just as they had been, and in their character as national parks they remained under precisely the same administration as before, that of the National Park Service of the Department of the Interior. But in their new character as game preserves they were placed under a new administrative agency, the Biological Survey, of the Department of Agriculture. Lest any confusion be produced in the mind of the reader by the different action taken in two apparently precisely similar situations, a word of explanation must be given.

When the Wichita Preserve was created the Wichita National Forest was a forest reservation of first rank and national importance, and possessed in its existing ranger force a personnel capable, with little if any readjustment, of handling the added activity.

Wind Cave and Sullys Hill, on the other hand, were not—and, indeed, are not to-day—national parks of first calibre and national interest, and they did not possess personnels capable of handling

⁹⁵ Moiese is a small place near Dixon and Ravalli, Montana.

⁹⁶ It should be understood that all of the big game preserves are bird preserves as well. No shooting of any sort—save the killing of predatory or noxious animals by the protecting officers—is permitted on them.

the work appertaining to the newly-conferred wild life feature. For reasons it is unnecessary to go into here, it was inadvisable to place the park sides of their handling with the new agency requisite to their functioning as game preserves. Therefore, they became government reservations, each possessing a two-fold status and each subject to two separate and distinct forms of administrative control.

A decision of the United States Supreme Court, rendered February 23, 1915,⁹⁷ had an important bearing upon the question of the right of the executive power to set aside public land for game and bird refuges. The decision did not turn upon this question specifically, but upon the broader including question of executive reserving for public purposes. It declared that the right inhered in the executive power, and cited the settings-aside of bird reservations by executive order⁹⁸ as instances of the proper exercise thereof.

Since the creation of Sullys Hill Preserve, but one piece of formal legislation⁹⁹ having to do with the game or bird refuges under the administrative control of the Biological Survey, other than the regular appropriations for their care and maintenance, has been enacted.¹ At the end of 1914 there were sixty-five refuges under the control of the Survey, All were bird refuges, and five were, in addition, big game refuges, as already related. Since that year the number of refuges has fluctuated, some exclusive bird refuges having been dropped, and others added from time to time.² All of these additional refuges have been created by execu-

⁹⁷ United States v. Midwest Oil Co., 236 U. S. 459.

⁹⁸ The decision cites forty-four such orders as having been made prior to 1910.

⁹⁹ The act of April 15, 1924 (43 Stat. L., 98), amending the bird refuge act of 1906 (Section 84, Penal Code of 1909) so as to protect animals as well as birds.

¹ With one minor exception. The disposition, by the Secretary of Agriculture, of a limited number of surplus bison from the big game preserves to municipalities or public institutions is authorized by a clause in the miscellaneous provisions of the Agricultural appropriation act of July 24, 1919 (41 Stat. L., 234, 257, 258, 270).

² For example, Blackbeard Island, the old naval live-oak reservation off the coast of Georgia, was made a bird refuge, July 17, 1914, by executive order; was abandoned as such May 25, 1915, and leased to the State of Georgia; and was again made a bird refuge February 25, 1924, by executive order. A further executive order, on September 20, 1926, definitely trans-

tive order with two exceptions of considerable importance which will be dealt with later. Including these exceptions there are now³ eighty refuges, all told, under Survey control.

The individuals leading the struggle for national migratory bird protection had recognized that the law passed in 1913 was a long ways from being invulnerable, and that a resting-content with the rather narrow success then attained would be taking dangerous chances. The constitutionality of the whole business was questioned by a by no means negligible body of opinion, and that it would be fought vigorously along that line was a certainty. To have it overturned by judicial decision, with a resulting reversion to the status *quo ante* 1913, would be set-back, it was clearly recognized, that would certainly be difficult, and that might conceivably be impossible, to overcome.

Steps were taken, therefore, concurrently with the riding through of the Migratory Bird Act on the back of an appropriation bill, to put the principle of the national migratory bird control beyond the reach of attack on constitutional grounds. It was proposed to do this by basing it on a treaty, and thus making it, in the language of the Constitution, a part of the "supreme law of the land." Senator Root, on January 14, 1913,⁴ and Senator McLean, on April 7, 1913,⁵ introduced resolutions requesting the Executive to institute negotiations with other North American powers looking to the entering-into of treaties, or conventions, mutually engaging the contracting powers to protect and preserve migratory birds.⁶ Closely following this action a proposed treaty, drafted by the legal department of the society which had been organized in 1911 to further the Shiras idea,⁷ was submitted to the governments of

ferred the island to the Department of Agriculture under authority of the act of June 7, 1926 (44 Stat. L., 700), for the disposal of real estate no longer needed by the navy. Likewise, the Yukon Delta Reservation, created in 1909, was abandoned, February 27, 1922, in accordance with executive order (No. 3642).

³ July, 1928. This includes Bear River Refuge, in Utah, in process of establishment.

⁴ 62 Cong. 3 sess., S. Res. 428.

⁵ 63 Cong. 1 sess., S. Res. 25.

⁶ Still earlier, on June 28, 1911, Senator McLean had proposed amending the Constitution to give the national government control over migratory birds. The proposal, however, got nowhere. See 62 Cong. 1 sess., S. J. Res. 39.

⁷ The American Game Protective Association.

the United States and Great Britain. The breaking-out of the World War in 1914 caused various delays to intervene, but the treaty was eventually concluded by the representatives of the two powers, in Washington, August 16, 1916. Its ratification was advised by the United States Senate two weeks later, on August 29, and it was formally ratified by the President on September 1, Great Britain ratified it on October 20. Ratifications were exchanged December 7, and the treaty was promulgated by presidential proclamation on the following day, December 8, 1916.

Meantime the 1913 act had been attacked on constitutional grounds, precisely as had been anticipated. Passed on March 4, 1913, the law had become effective on October 1 of the same year, upon the promulgation by the President of regulations which had been drafted by the Biological Survey, and approved, in amended form, by the Secretary of Agriculture on September 27, after a ninety-day period of opportunity for protest and suggestion had elapsed; during which public hearings were held on the originally-proposed regulations in various parts of the country.⁸ The regulations promulgated in 1913 were further amended one year later, on October 1, 1914; and proposed new regulations, to be adopted after another ninety-day period of consideration had elapsed, were made public on May 20, 1916, just about the time the details of the treaty were being threshed out in Washington. Under these various regulations efforts were at once made to enforce the 1913 act with the small forces available for the purpose.⁹ A number of convictions were secured in United States district courts, but in two of these courts the law was flatly held to be unconstitutional. A demurrer to the indictment was upheld on that ground in May, 1914, by the court for the Eastern District of Arkansas.¹⁰ An appeal was at once taken by the government to the United States Supreme Court for the final determination of the question.

But before that question could be passed upon, it had been converted into a dead issue by an occurrence which we have already

⁸ Omaha, Boston, Trenton, New Orleans, and Washington.

⁹ The scheme adopted for the administration and enforcement of the Migratory Bird Law called for a force of federal district inspectors on full pay in general control of a force of federal wardens on nominal pay. The latter were simply state wardens sworn in as federal wardens and thus clothed with dual authority. There were seven inspectors and 172 wardens in 1914; sixteen inspectors and 195 wardens in 1916.

¹⁰ *United States v. Shauver*, 214 Fed., 154.

noted, the conclusion of the Migratory Bird Treaty in 1916, and by another which eventuated July 3, 1918, when the so-called Migratory Bird Treaty Act, making the treaty effective on the part of the United States, was enacted (40 Stat. L., 755).¹¹ The constitutionality of the 1913 act having thus become a matter of no moment, the government's appeal from the decision of the Arkansas district court was dismissed on motion of the Attorney General on January 6, 1919. Something over a year later, on April 19, 1920, the question of the constitutionality of the treaty and the act passed thereunder came before the Supreme Court and was definitely settled by the decision holding both to be constitutional.¹²

Important as are the two acts of 1913 and 1918, the central incident of all the effort and development of the period of agitation for the principles of the Shiras bill was unquestionably the treaty of 1916. It is a big and outstanding thing for two sovereign powers to engage with one another to institute jointly a conservational policy with respect to a great resource common to both. In an instance such as the one under consideration, moreover, it is an imperatively necessary thing. Where a resource is of the literally liquid nature of the migratory bird life that flows from Canada to and through America in the fall and back to Canada in the spring any scheme for its protection that is less than dual or mutual is conversational rather than conservational. Altogether apart, therefore, from the impregnable constitutional buttressing that the treaty of 1916 gives to the act of 1918, the practicality which it firmly establishes makes it a governmental measure of preëminent importance. In short, the treaty is the life of the law. The year of its becoming effective is unquestionably the greatest of all those decennial years in the Biological Survey's history since 1885.

A comparison of the two acts of 1913 and 1918 will disclose a rather striking fact. Whereas the earlier act, which, as we have seen, came perilously close to being bowled out on constitutional grounds, was a comparatively mild one, considered from the standpoint of the restrictions it placed upon the existing migratory bird

¹¹ Canada had previously given effect to the treaty by an act of Parliament approved August 29, 1917, and by regulations promulgated thereunder May 11, 1918.

¹² *Missouri v. Holland*, 252 U. S., 416.

status; the later act, on the contrary, made practically unamendable and unrepealable by being riveted to a treaty, was nothing if not drastic. The 1913 act did one big thing: ¹³ it prohibited spring shooting by prescribing a maximum open season on migratory wild fowl of three and one-half months, so placed on the calendar that the breeding months in the spring of the year were closed everywhere.

But the 1918 act not only did everything the earlier act did but several things beside. It proscribed, in all parts of the country, and at all times, the one thing that had been even more destructive to migratory game bird life than spring shooting; namely, selling in the open market. It established drastic bag limits. It placed a perpetual closed season on certain migratory nongame birds, whether they were insectivorous or not; ¹⁴ and established close terms of years for certain game birds in especial need of protection. It superseded the Lacey Act portion of the Penal Code having to do with the transportation of game birds in interstate commerce by prohibiting the carriage or shipment of both dead and live birds, whether migratory or not, out of a state by any means whatever contrary to the laws of the state in which the birds were killed, or from which they were carried or shipped. It avoided the danger of over-rigidity by providing for the taking of birds in the interest of science or for purposes of propagation; for the sale of propagated birds under reasonable restrictions; for the destruction, under restrictions, of birds ordinarily protected when necessary to the preservation of agricultural crops or other property; and finally and chiefly, for the making of regulations to meet shifting conditions. In short, this well-thought-out act may be said to make thorough provision for the carrying-out by the United States of its part of the bargain represented by the Migratory Bird Treaty. It made certain that sundry necessary

¹³ And two lesser ones. It forbade shooting at night; and it outlawed utterly the killing of migratory insectivorous birds, thus in effect establishing the A. O. U. Model Law by federal authority. By 1913 this law had been voluntarily adopted by all of the states save nine.

¹⁴ A complete list of the birds covered by the treaty is set forth in the first article thereof. About 220 species of migratory birds are excluded from the terms of the treaty because they are not specifically named, or because they do not feed chiefly or entirely on insects. For example, such migratory birds as cormorants, starlings, sparrows, blackbirds, and crows are not included in the treaty. In general it may be said that all are included that ought to be.

restrictions should apply everywhere in the country regardless of whether state law imposed them or not; but with state restrictions more stringent in character than its own it did not interfere.¹⁵

Ten regulations under the Migratory Bird Treaty Act were prepared for the Secretary of Agriculture's adoption by the Biological Survey, with expert advice, immediately upon the act's passage, and became effective when the President approved them, July 31, 1918. Amendments were made to some of them, and an additional regulation adopted by proclamation, October 25, 1918. Each year since then at least one amendment to the regulations has been adopted.¹⁶

The regulations, as amended from time to time, are now eleven in number, and cover the following subjects: definitions of birds and terms, permissible and prohibited means of taking, open seasons, possession, bag limits, shipment, transportation, propagation, sale, special rights of Indians and Eskimos, scientific collecting, killing to protect property, and state laws. Appropriations for the carrying-out of the act and regulations have been made regularly since 1918 as part of the regular Biological Survey appropriations in the Agricultural appropriation acts.¹⁷

¹⁵ For example, the law establishes a maximum open season of three and one-half months. If state law anywhere decrees a similar season of four months, that law does not invalidate the federal law. But if it decrees three months, the longer term established by the federal law will not apply. Similarly, the right of a state to circumscribe privileges permitted by the federal law and regulations thereunder extends to every feature covered thereby.

¹⁶ The full text of the Migratory Bird Treaty, the Treaty Act, and the Treaty Act Regulations, as amended, with a list of the dates upon which amendments have been made, has been published since 1924 as part of the Service and Regulatory Announcements of the Department of Agriculture; the entitlement in 1924 and 1925 being "Text of Laws of the United States and Canada Relating to Game and Birds." In 1926 this was changed to "Text of Federal Laws and Regulations Relating to Game and Birds." It was further changed in 1927 to "Migratory-Bird Treaty-Act Regulations and Text of Federal Laws Relating to Game and Birds" (S. R. A.—B. S. 68. Issued October, 1927). A similar publication containing the Canadian act and regulations is issued by the Commissioner of Canadian National Parks.

¹⁷ Cf. the Agricultural appropriation act of October 1, 1918 (40 Stat. L., 973, 994), with the Treaty Act itself, Section 9 of which reappropriates and makes available for its own carrying-out the unexpended balances of sums appropriated for the fiscal years 1917 and 1918 for the carrying out of the 1913 Migratory Bird Act.

By the year 1922 the country had witnessed a political overturn from the 1913 status, and the writing of a new tariff act was on the cards. If the impendency of this event, however, raised any hopes in the minds of certain millinery dealers of an expungement of the provisions in the 1913 tariff law prohibiting the importation of plumage, they were rudely undeceived. Not only was plumage kept on the forbidden list, but added emphasis was given to the keeping. The proviso attached to Paragraph 1419 of the tariff act of September 21, 1922 (42 Stat. L., 858, 915, 916), prohibits the importation of plumes and bird parts and provides for the seizure by Treasury officers of any such material found in the country after the passage of the act. As in the case of the 1913 act, an exception is made of ostrich plumes and plumes of domestic fowl.

The reason for this adherence to a wise principle was not moral, or sentimental, or altruistic, or even political, so much as it was economic. The *status quo* was maintained and strengthened because the reputable millinery dealers, comprising most of the big wholesalers and the genuinely representative men in the business, demanded that it should be. They had accepted the 1913 decision in good spirit as *fait accompli*, and they had been abiding by it. But the shyster element had not been abiding by it. It had been bootlegging in contraband plumage to the serious business hurt of the decent portions of the trade; and those decent portions, being unable to protect themselves against foul tactics of this sort, insisted that the government should make the way of the shyster so hard that he would either give over his evil ways or seek a new line of endeavor. They protested, in short, against a state of things that penalized them for being law-abiding. Hence the seizure provision and the stiffening-up, instead of the abandonment, of the non-importation clause of 1913.

Inasmuch as both great political parties have now written this principle, so vital to American bird life conservation, into what may be termed their respective representative statutes, the prospects of a national withdrawal from that principle may safely be declared to be very remote. Directly, this prohibition does not affect the Biological Survey or its activities, the actual enforcement of the law being very properly in the hands of the Treasury Department. Indirectly, however, it has a bearing upon

the Survey's work and objects at many points, and for that reason a somewhat thorough exposition of it has been deemed necessary. It closes completely one hole left unplugged by the Lacey and Migratory Bird Treaty Acts.

In the year following the enactment of the first Migratory Bird Act a new complication affecting the entire migratory wild fowl situation forced itself into notice as a possible threat to all the good which might result from the operation of that law, or any other law failing to take note of the fact that all the conservation in the world will not conserve wild fowl unless they are assured of breeding and feeding grounds. That immediate good did flow from the act of 1913 the Survey, at any rate, was certain. Speaking of the operation of the law at the end of three years, it declared that reports received from all parts of the country contained

incontrovertible evidence that since the law became effective there has been in most of the states a very marked increase in the number of wild fowl and shorebirds; that wild fowl have become unusually tame in spring; and that many thousands of waterfowl are breeding in certain localities where they had not nested for many years.¹⁸

And two years later it was declared that as a result of the law and the regulations under it having been observed by fully 95 per cent of the sportsmen of the United States, wild fowl were more abundant than at any other time in the preceding twenty-five years.¹⁹

Meantime, however, mortality among wild ducks and various other migratory game birds had become so alarming at various points in the West, particularly in the Bear River marshes about the Great Salt Lake, that the Survey was called upon for an extensive investigation, and a proviso was attached to the food habits clause in the Survey section of the Agricultural appropriation act of June 30, 1914 (38 Stat. L., 415, 433), setting aside \$5000 for that purpose. Similar appropriations were made during the two years following. This was not the first time the Survey had been

¹⁸ Biological Survey, Annual Report, 1916, p. 16.

¹⁹ "Federal Protection of Migratory Birds," by George A. Lawyer, Yearbook Separate, No. 785. 1918.

called upon to examine into diseases of wild fowl. Isolated instances of similar epidemics in various parts of the country had been studied several years before in coöperation with the Bureau of Animal Industry, and the disease causing them had been ascertained to be coccidiosis, an ailment akin to various diseases of domestic fowls. The cause of it was the pollution of wild fowl waters by drainage from barn yards. The epidemic in Utah, however, which was on a vastly greater scale than any other of these earlier ones, proved to be something entirely different, as did other outbreaks in other parts of the West. At first it was thought to be due to an abnormal alkaline content in the water, but it was soon ascertained that overcrowding of water areas by wild fowl had much, if not everything, to do with it. It was thus that attention was first drawn to the danger to the nation's supply of migratory wild fowl from the extensive drainage of marshes, and the diversion of the water of ponds and lakes for purposes of cultivation and irrigation. The places available for the birds to rest, feed, and to some extent, breed, on their annual migrations, were being reclaimed at such a rate that unhealthy crowding on the areas remaining was inevitably resulting. This was especially the case in the West, where the bulk of the reclamation work was going forward. Nevertheless, many swamp and marsh areas in the East, tarrying-points since time immemorial on the great spring and autumn flights, were being drained for agricultural utilization. Reclamation had become a subject of enthusiasm in America because of the undeniably wonderful results produced by some of the earlier projects. The consequence was that many projects came to be inaugurated without sufficient preliminary consideration of all the factors involved. The fact was lost sight of that it is one thing to reclaim land, another to utilize it profitably when reclaimed. Land areas began to appear here and there where swamps or lakes had been. They were perfectly drained; but they were also, unfortunately, perfectly impossible oftentimes from any agricultural or grazing standpoint. The one thing for which they were useful, the accommodation of migratory wild fowl, had been reclaimed out of them.²⁰ There was a bit of the pathetic in this failure of the drainage phase of reclamation, for the

²⁰ Walker Lake in Arkansas was set aside in 1913 as a bird refuge. Drainage ruined its usefulness and it was discontinued in 1926.

initial belief of the lovers of wild life had been that reclamation in general would be a help rather than a hindrance because of the dams for the impounding of water which its irrigation phase created. In practice this help had not proved to be anything like so great as had been expected. Water areas were created, to be sure, where wild fowl might alight, but most of them lacked the plant life upon which wild fowl feed, and the sedgy borders they desire for nesting.²¹ They did not begin to take the place of the areas eliminated by the drainage phase and those areas in the far West that had been adversely affected by a long succession of abnormally dry years. In a number of instances the complete drying-up of some lakes²² formerly extensively resorted to by wild fowl had resulted from prolonged drouth conditions. Other areas were considerably straitened.

General attention having been drawn to the danger of the situation by the investigations of the Survey, efforts began to be made by associations of sportsmen, and others especially interested, so to amplify existing wild life conservational laws as to take care of the unforeseen feeding ground problem. The obvious thing to do was to stop further unnecessary drainage. This it was proposed to accomplish by ascertaining the remaining marsh and water areas throughout the country more valuable for the conservation of wild fowl than for agricultural purposes after drainage; by purchasing or renting these areas; and then by putting them under the control of the Survey to be administered partly as refuges, where no shooting was to be permissible at any time, and partly as national shooting grounds to be open during the shooting seasons to all alike.

Largely through the efforts of the American Game Protective Association a bill embodying these general ideas was introduced in the Sixty-seventh Congress, in 1921,²³ by Representative Anthony, of Kansas. It was a rather novel measure in that it con-

²¹ Pathfinder and Shoshone reservoirs in Wyoming, set aside as bird refuges in 1909, were discontinued in 1922 because they were found to be useless as feeding places. Pathfinder, however, was reestablished by executive order in May, 1928.

²² For example, Goose Lake, on the California-Oregon border, which a few years ago presented a water area forty miles long by fifteen wide, has become a bed of drifting sand.

²³ 67 Cong. 1 sess., H. R. 5823.

tained, or purported to contain, within itself the means for its own financing; as well as for a considerable part of the financing of existing national laws for the protection of game. The proponents of the bill simply took a page from the book of game control in the states. The states had, for a number of years, been making the returns from licenses to hunt and fish pay for the administration of their game laws. Throughout the country licenses to shoot in season were being issued by the states to a total in excess of four millions.²⁴ A money return averaging slightly more than a dollar per license was being derived from this source. It was proposed, therefore, to require all hunters of migratory birds to secure national licenses in addition to their state authorizations; said licenses to be issued by the postmasters throughout the country at a uniform rate of one dollar. In this way it was believed that ample funds could be secured for the carrying-out of the objects of the bill from those who would be primarily benefited by it; and the population at large thus relieved of the expense that extensive federal acquisition of marsh and water areas, and a more intensive system of federal game warden control, would entail.

The bill passed the Senate in the Sixty-seventh Congress, but failed of passage in the House. Reintroduced in slightly modified form in the Sixty-eighth Congress²⁵ it passed the House, February 21, 1925, but failed to come up for consideration in the Senate. It had a similar fate in the first session of the Sixty-ninth Congress,²⁶ a senate filibuster making a *casus loquendi* out of it in order that certain other legislation might be side-tracked. A frenzy of filibustering in the second session of the same Congress again suppressed it.

The last word as to the Survey's position on the question was given utterance early in December, 1927, just as the first session of the Seventieth Congress was convening, when the Survey's chief told the Fourteenth National Game Conference of his

firm conviction that the sportsmen and bird lovers of this country have come to a place where they must fish or cut bait on the matter

²⁴ For the season 1922-23, 4,341,408 hunting licenses were issued by the states for \$5,385,489. For 1923-24 the figures were 4,395,038 and \$5,594,982. For 1924-25 they were 4,904,740 and \$6,190,863.94; for 1925-26, 5,168,353 and \$6,872,812.59; and for 1926-27, 5,938,825 and \$8,155,535.

²⁵ 68 Cong. 1 sess., H. R. 745.

²⁶ 69 Cong. 1 sess., H. R. 7479.

of federal refuges for migratory birds. The matter of legislation to benefit waterfowl is one that is distinctly up to those individuals and organizations who have really at heart the cause of these birds. That the Federal Government should to a greater extent redeem its obligations to Canada in the matter of providing sanctuaries for waterfowl is beyond quibble. Give the refuge program a chance to work; it may eventually preclude the imposition of more stringent restrictive measures.

A bill substantially similar to the shooting grounds bills of preceding Congresses was introduced in the first session of the Seventieth Congress.²⁷ Like its predecessors, it failed of passage, but the ultimate enactment into law of the bird sanctuary principles it contains would seem to be more or less a foregone conclusion, as there is, apparently, little or no opposition to them. To the federal license and public shooting grounds features, however, there is much opposition.²⁸

But although the proposal to establish a national system of migratory bird refuges has so far failed to materialize, somewhat the same idea on a smaller scale attained statutory standing with the passage of the act of June 7, 1924 (43 Stat. L., 650), authorizing the purchase of bottom lands along the Mississippi River between Rock Island, Illinois, and Wabasha, Minnesota, for the creation of "the Upper Mississippi Wild Life and Fish Refuge," to be under the jurisdiction of the Department of Agriculture with respect to vegetation of all kinds, game birds, and fur-bearing and game animals; and under the Department of Commerce with respect to fish and marine life.²⁹ The act was made more workable by the joint resolution of March 4, 1925 (43 Stat. L., 1354), removing certain restrictions governing the acquisition of lands which had been found in practice to constitute an impossible handicap to the consummation of the objective aimed at.

This refuge, the idea for which originated with the Izaak Walton League of America,³⁰ will extend when complete along the banks

²⁷ 70 Cong. 1 sess., H. R. 5467, S. 1271.

²⁸ One game conservation society has denounced the proposed act as "a highly improper measure which has been made to seem expedient by the largest expenditure of money since the Volstead bill was enacted."

²⁹ See Regulations for the Administration of the Upper Mississippi Wild Life and Fish Refuge. Service and Regulatory announcements, Biological Survey, issued July, 1927.

³⁰ Organized in Chicago, 1921, for furtherance of general wild life conservation.

of the Mississippi River between the points mentioned for a distance of three hundred miles, and will furnish an ideal resting and feeding ground directly on one of the greatest annual routes of migratory wild fowl. The Savanna-Bellevue National Forest, containing some ten thousand acres in northwestern Illinois and eastern Iowa, has been made a part of the refuge and will be administered by the Survey, though retaining its formal status as a national forest.³¹

The act of June 28, 1906, protecting birds and their eggs on refuges, which had been codified as Section 84 of the Penal Code of 1909, was amended by the act of April 15, 1924 (43 Stat. L., 98), so as to extend protection to animals on the refuges, thus in effect making general wild life sanctuaries of these refuges originally created for the protection of birds alone.

The Survey in Alaska. We have seen heretofore³² how the first work of the Survey in Alaska took place in the late nineties—consisting of the extension to that territory of the work in biological exploration then constituting the major portion of the Survey's activities. This continued to be the sole point of contact with the region until 1902; for although the Lacey Act of 1900 applied to the territory equally with other parts of the United States, it was, as a practical matter, well-nigh inapplicable there. In the first place, the territory's geographic situation, and the stage of economic development at which it had arrived, rendered almost physically impossible any Alaskan violations of the act in any of its provisions other than those having to do with the transportation of game. And, in the second place, even those provisions were impotent as to Alaska prior to 1902, because Alaska was without any game law worthy of the name, upon which those provisions might be based. A local statute forbidding killing had to be violated, it will be recalled,³³ before the Lacey Act could become effectively operative. And one of the things the passage of that act revealed was the fact that the only law remotely resembling a game law

³¹ A proposal (69 Cong. 2 sess., H. R. 16807) to create a somewhat similar refuge on Bear River marshes, Great Salt Lake, was killed by the same filibuster that disposed of the Shooting Grounds bill in the same session. It was introduced and passed, however, in the following session.—Act of April 23, 1928 (45 Stat. L., 448).

³² See page 35.

³³ See pages 84-85.

that Alaska possessed was the act of June 6, 1900, already referred to,³⁴ protecting the eggs of wild fowl.

As a result of this state of affairs a great commerce in deer, mountain sheep, moose, and bear carcasses was flowing out of the country, to say nothing of skins and trophies. Market hunting was flourishing, which meant that the situation was disquieting to sportsmen;³⁵ and several leading associations of the latter, particularly the Boone and Crockett Club, set on foot the movement that resulted in the passage of the act of June 7, 1902 (32 Stat. L., 327).

This law was a comprehensive game protective statute, making provision for close and open seasons, bag limits, hunting restrictions, and all the usual features of such acts. It included the A. O. U. model law idea by prohibiting the killing at any time of non-game birds.³⁶ Sale within and shipment out of Alaska were forbidden as to hides, trophies, carcasses, etc., with certain exceptions to be prescribed by the Secretary of Agriculture, who was also empowered to make general rules and regulations governing seasons, killing restrictions, etc. Game could be sold in season, and could be killed for food at any time by Indians or Eskimos; or "miners, explorers, or travelers, on a journey when in need of food."³⁷

In certain respects this law was a success, but on the whole it was unsatisfactory. It did, thanks to the active coöperation of the

³⁴ There was also in existence at this time, as will be brought out later, an act passed March 3, 1899 (30 Stat. L., 1253, 1279, 1281), which dealt with fur-bearing animals. Section 173 of this act was a restatement of R. S., sec. 1956, originally enacted July 27, 1868 (15 Stat. L., 241). In considering the development in Alaska of governmental wild life control, the distinction between game animals and fur-bearing animals must constantly be borne in mind. The 1900 act, in addition to protecting the eggs of wild fowl, provided for semi-occasional inspections and reports by the Governor upon the killing of seals "and other fur-bearing animals." Game animals are not fur-bearers in the strict sense of the term, and vice versa; though there is something like an overlapping in the case of the bear.

³⁵ It is scarcely necessary to point out that this situation was not helped any by the immense and none too orderly influx of gold seekers into Alaska, beginning in 1898.

³⁶ Also the prohibition against the destruction of nests and eggs contained in the 1900 law.

³⁷ The abuse possibilities of this phrase speak for themselves. It is probable, however, that the law could not have been passed without it. It gives expression to an ancient right in Alaska, and a very jealously regarded one.

Treasury Department, stop the shipping out of game, hides, and trophies by the wholesale. But, making no provision for the appointment of wardens, beyond wishing the job as an extra chore on United States marshals and deputy marshals—a notoriously unworkable device—its effect upon such abuses as killing out of season, game wasting, etc., long inordinately committed in Alaska, was practically negligible. Furthermore, it proved to be a very unpopular law in the territory, and a great deal of bitter feeling was stirred up by it. An effort was made to repeal it in 1904.³⁸ This was not because the Alaskans as a whole were opposed to game conservation, but because they believed they were being discriminated against, in the matter of permits to ship trophies, in favor of the wealthy sportsmen from the continental United States who invaded the country in considerable numbers each year. Most of them went to the Kenai Peninsula because of its accessibility and because of the giant moose found there, the heads of which had long been in great demand as trophies. Because of the danger to the perpetuation of this unique species and other game of the region, brought about by this intensified pursuit, the Department of Agriculture, through the Survey, began to restrict the issuance of permits for the shipment of trophies from the Kenai country. Every effort was made to administer this difficult feature of the law with impartiality, but the sentiment in Alaska was such that nothing would satisfy short of “home rule” in the granting of permits. Therefore, with full approval of the Survey, heartily glad to be rid of a thankless job, and of the sportsmen’s associations which had worked for the passage of the 1902 law, that law was somewhat radically amended and enlarged by the act of May 11, 1908 (35 Stat. L., 102). Under the state of things produced thereby, licenses, which were required both for hunting and exporting instead of the former permits, were issued by the Governor of the territory. Licenses were also required to follow the occupation of guiding, and were likewise issued by the Governor. The old permit system, however, continued to apply to hunting for the purpose of scientific collecting, and to the exporting of specimens for propagation, exhibition, or scientific purposes; the permits in all cases being issued by the Secretary of Agriculture. To this officer, also, a report of the licenses issued was required to be

³⁸ 58 Cong. 2 sess., S. 4166.

made by the Governor. The Governor was also authorized to appoint and supervise a force of game wardens. The cost of this new enforcement system was to be met by annual appropriations, for which estimates had to be submitted by the Secretary of Agriculture.³⁹ The gist of the change was, then, that the exasperating Washington authority, represented by the Survey, was pushed into the background, but was still left in partial control by virtue of the estimate provision.

Game matters in Alaska continued to be administered under the 1908 amendment until 1924. Meantime, however, certain other developments of importance along parallel lines had been taking place to which some notice must be given.

In what has been said about Alaska's lack of a game law prior to 1902 the distinction between game animals and fur-bearing animals was pointed out; and in the course of that pointing-out reference was made to the act of March 3, 1899 (30 Stat. L., 1253, 1279, 1281). This was an act providing a criminal code for the Territory of Alaska, and Section 173 of Chapter XII thereof placed in the hands of the Secretary of the Treasury authority to regulate the killing of fur-bearing animals of all kinds, both land and marine. This section, however, was but a restatement of existing law, first enacted as Section 6 of the act of July 27, 1868 (15 Stat. L., 240, 241), and incorporated as Section 1956 of the Revised Statutes of June 22, 1874.

In 1879 the Treasury Department had jurisdiction over the Pribilof Islands in the Bering Sea for the better protection of the great seal herds there. No other Alaskan islands at that time were under that department's control. Congress, by the act of March 3, 1879 (20 Stat. L., 383), gave the Secretary of the Treasury authority "to lease unoccupied and unproductive property of the United States *under his control*"⁴⁰ for the leasing of which there is no authority under existing law." Thereafter, beginning in 1882, the Secretary began to lease a number of small islands off

³⁹ The first appropriation, \$10,000, was made in the sundry civil act of March 4, 1909 (35 Stat. L., 945, 990). Subsequent appropriations were carried annually in the same act till 1922. From then on to 1925 they were in the Interior appropriation act. During the entire period they averaged something over \$18,000 per year.

⁴⁰ The italics are mine.

the southern coast of Alaska for the propagation of foxes. By 1898 twelve such islands had been leased for this purpose. The act of May 14, 1898 (30 Stat. L., 409, 413), in extending the Homestead Laws to Alaska, specifically excepted from the operation of those laws "islands leased or occupied for the propagation of foxes." The situation at the close of 1899, therefore, was that it possessed this jurisdiction plus the right to lease twelve islands for the propagation of foxes, a species of industry which we shall examine somewhat closely a little further on.

On February 14, 1903, there was enacted the statute creating the Department of Commerce and Labor (32 Stat. L., 825, 829). Sections 7 and 10 of that act transferred to the new department from the Treasury Department all of the authority which the latter possessed with respect to the protection of fur seals in Alaska. And, inferentially, it also transferred all of the fur-bearing animal authority.

Apparently, however, there was some doubt about this. Had there not been, an executive order issued by President Roosevelt a year later, February 2, 1904, would seem to have been unnecessary. That order purported to transfer to the Department of Commerce and Labor the right of the Treasury Department to lease "certain islands"—meaning the twelve that the Treasury had leased between 1882 and 1898—off the coast of southern Alaska for the propagation of foxes. It would seem, nevertheless, that the transferee in this order, made little, if any, effort to exercise the leasing right for several years. At any rate it was stated in the annual report of that transferee for 1913—nearly a decade after the issuance of the order—that it had been determined to lease the "certain islands" "under authority of law," and by virtue of the said executive order.

Meantime the act of April 21, 1910 (36 Stat. L., 326, 327), providing for the protection of the fur seals of Alaska, and for other purposes, had been passed. This act made some substantial changes in the fur-seal protective procedure, but the fur-bearing animal situation was left practically as it had been, save that the jurisdiction with regard thereto was in the Department of Commerce and Labor instead of in the Treasury. In 1910, therefore, the wild life⁴¹ jurisdiction in Alaska was a somewhat scattered affair.

⁴¹ That is, land wild life.

The Department of the Interior, through the territorial government of Alaska, divided the jurisdiction as to the game phases of it with the Department of Agriculture, represented in the premises by the Biological Survey. The fur-bearing part of it was held by the Department of Commerce and Labor, through the Bureau of Fisheries. The result was an awkward division of authority.

This fact was soon recognized by the Bureau of Fisheries, and, when sentiment began developing for a readjustment, that Bureau interposed no objections.⁴² In fact in their annual reports for 1919⁴³ both the Secretary of Commerce⁴⁴ and the Commissioner of Fisheries expressed the desire that jurisdiction over land fur-bearing animals be transferred to the Biological Survey. A bill was introduced in Congress in 1917 providing for the transfer, but nothing came of it.

Finally, however, the unsatisfactory situation was largely, but not entirely, cured by the act of May 31, 1920 (41 Stat. L., 694, 716), which transferred all powers and duties with regard to all land fur-bearing animals in Alaska⁴⁵ to the Secretary of Agriculture; and transferred to the Secretary of Commerce all powers and duties with regard to walruses and sea lions, which the game laws of 1902 and 1908 had placed, rather incongruously, with the

⁴² Early in 1915 a joint committee of the two departments concerned was appointed to devise a plan to simplify the administration of the Aleutian Islands Bird Reservation in Alaska, which had been created by executive order two years before, with respect to fur farming therein. The reservation itself was under the Survey, but the fur-bearing animal administration thereof under the Bureau of Fisheries of the Department of Commerce. It reported that such a distribution of authority was unwise and should be adjusted to conform to the functions and equipment of the two departments. Both departments concurred in the recommendation. See Department of Agriculture, Annual Report, 1915, p. 36.

⁴³ As well as in those for several other years in the period 1910-1920.

⁴⁴ After March 4, 1913, by virtue of the act of that date (37 Stat. L., 736) the labor features of the Department of Commerce and Labor were placed under the new Department of Labor. Fisheries, naturally, remained under the Department of Commerce.

⁴⁵ With the exception of all land fur-bearing animals on the Pribilof Islands, declared a special reservation under the jurisdiction of the Department of Commerce and Labor by Section 5 of the act of 1910. This was an amendment of a joint resolution of March 3, 1869 (15 Stat. L., 348), which was reenacted as Revised Statutes, Section 1959 and also as Section 176 of the act of March 3, 1899 (30 Stat. L., 1253, 1280). All these earlier provisions reserved the islands of St. Paul and St. George. The amendment extended the reservation to the whole Pribilof group.

Secretary of Agriculture. Along with this readjustment went the leasing rights for fox-farming purposes of those twelve "certain islands" off the coast of southern Alaska, which the Secretary of the Treasury had acquired back in the eighties.⁴⁶ These islands were mostly in the Semidi, Chugach, and Shumagin groups. It developed after the 1920 transfer that two of them now lay within the boundaries of the Chugach National Forest,⁴⁷ so those two were transferred to the Forest Service in order that its jurisdiction might be complete, and that their leasing for fox propagation might be handled by the authority logically situated therefor.⁴⁸ Already for several years the Forest Service had been leasing islands for this purpose which lay within the two Alaskan national forests, under its system of special use permits.

The improvement brought about by this legislation was that whereas before its passage fur-bearing animal jurisdiction and game animal jurisdiction had been absolutely separated, departmentally, they were now only partially separated. The Biological Survey now had full land fur-bearing animal jurisdiction and—under the just-mentioned 1908 amendment—full game jurisdiction, subject to the "home rule" device which put the granting of licenses in the hands of the Governor of Alaska together with the control of the game warden service. This was undoubtedly a great improvement over the status existing prior to the law's passage, but that it contained the seeds of discord scarcely needs to be pointed out. Land fur-bearing animal protection was now to be administered entirely by one authority, the Biological Survey of the Department of Agriculture; and game animal protection, almost entirely by another, the territorial government of Alaska, under the Department of the Interior.

In this same act, which was the Agricultural appropriation act for the fiscal year 1921, there was included another most important provision that was concerned not so much with administration as with the inauguration of a practically new form of wild—or

⁴⁶ For a complete account of this matter, see 25 Op. Att. Gen. 497.

⁴⁷ The Forest, of course, had been established after the leasing right had adhered to the Treasury.

⁴⁸ In accord with the system which we have already observed in the Continental United States with regard to game refuges on national forests. The remaining ten islands remained under the Survey's jurisdiction until February 29, 1928, when an executive order (No. 4818) transferred them to the Department of the Interior.

modified wild—life research. This had to do with reindeer, which had come to occupy a position of great economic importance with regard to Alaska in general, and of even greater social importance with regard to its Indian and Eskimo population.

These animals had first been introduced into Alaska from Siberia in 1892, on the initiative of the United States Bureau of Education, in order to furnish the Alaskan Eskimos with a wholesome and profitable occupation. The former hunting resources of those people having become considerably impaired, and they having nothing else to fall back upon, they were beginning to suffer from destitution and consequent deterioration. Between 1892 and 1902 reindeer to the number of twelve hundred and eighty were imported, the original herds being established around Teller, on the Seward Peninsula. By 1920 the original importations had increased to something like two hundred thousand animals, not counting about one hundred thousand that had been killed for food and clothing, and the success of the experiment had been established beyond question.

The original intention had been that the experiment should be for the benefit of the Eskimos alone. The Bureau of Education, however, had brought some Laps from northern Norway, who were skilled in the traditional old-world methods of reindeer herding and handling, to teach the Eskimos, and they gradually acquired small bunches of their own in the form of bonuses granted them from the increase to retain their interest. Some of them in time sold portions of their holdings to other white men who had seen the possibilities of reindeer raising in a territory capable of grazing between three million and four million animals.⁴⁹ The result was that by 1920 about a quarter of all the reindeer in Alaska was in white ownership, and efforts were being made to place the industry on a business basis, and to create a market for reindeer meat in the United States.⁵⁰ This element was especially

⁴⁹ The estimate of the Biological Survey. That of the Bureau of Education is ten million.

⁵⁰ And with considerable success. Some small refrigerating plants had been established on the coast, and the meat had been shipped occasionally to Seattle and sold there. A proviso in the appropriation clause for meat inspection by the Bureau of Animal Industry in the Agricultural appropriation act of June 30, 1914 (38 Stat. L., 415, 420), had extended the provisions of the meat-inspection act of June 30, 1906 (34 Stat. L., 674), to the inspection of the carcasses of reindeer.

desirous to get the industry away from the primitive methods of the original herders, and placed, by dint of scientific investigation and oversight, on a plane comparable to other forms of livestock raising. The result of this demand was the commissioning of the Biological Survey, by virtue of a clause in the above-referred-to appropriation act, to inaugurate scientific research and demonstration in Alaska, in coöperation with the Bureau of Education, with regard to the welfare and development of the new industry.⁵¹

Accordingly, Dr. E. W. Nelson, the Chief of the Survey, visited Alaska in 1920 to view the situation and establish the work. An experimental laboratory was set up at Unalakleet and an experienced veterinarian and pathologist, and two grazing experts from the Forest Service, were stationed there to study the parasites and diseases of the reindeer; and also to investigate the grazing conditions, the forage plants, and the methods of herding throughout the entire reindeer region. It was also proposed to examine into the feasibility of crossing the reindeer with the heavier native caribou in an effort to produce a meatier animal. There was thus inaugurated, what, from an economic standpoint alone, has been one of the most important pieces of work ever undertaken by this or any other government. It is estimated that the reindeer industry in Alaska, when developed to its fullest possible extent, will produce annually a return, from its meat product alone, worth more than the yearly Alaskan output of precious metals, and second only to the fisheries as a permanent income-producing asset.⁵²

No better evidence of the past success of the reindeer experiment and of its future possibilities could be presented than the Canadian reaction thereto. Canada has watched the progress of

⁵¹ The reader may wonder why this work was not given to the Bureau of Animal Industry, the reindeer being a domesticated animal. The reason given is that the reindeer is merely a domesticated form of the wild caribou which exists in Alaska in great numbers. The Survey, already having jurisdiction as to the caribou, was conceived to be the logical instrument for the study of the caribou's newly-imported domestic cousin.

⁵² For a complete account of the beginning and progress of this work, see Departmental Bull. No. 1089, "Reindeer in Alaska" (1922), and No. 1423, "Progress of Reindeer Grazing Investigations in Alaska" (1926). Recently a bill has been introduced in Congress providing for the introduction of a herd of musk oxen into Alaska with a view to their domestication and utilization along the lines followed with the reindeer. See H. R. 334, 70 Cong. 1 sess.

the experiment with ever-increasing interest, and has decided to establish reindeer on the Mackenzie River delta in order to enable the Eskimos of the far-northern areas to become self-supporting. At this writing two Canadian representatives are in Alaska obtaining a practical knowledge of herd management and forage plants, and securing information as to the most practicable route over which to make a drive of some two thousand reindeer from Alaska to the delta country, an operation that will consume about three years. Needless to say, the Survey is according this project all possible coöperation.

The experiment station established at Unalakleet in 1920, when the Survey embarked in the reindeer research, was moved to Nome in 1922. It was transferred to its present location at Fairbanks in 1925 in order that it might be conducted in coöperation with the Alaska Agricultural College and the Alaskan Railroad. It is believed that this change in location will possess many advantages, not the least of which should be the interesting of young Alaskans in the reindeer business, and their adequate training to conduct it successfully.

The weakness of the wild life situation in Alaska, due to divided authority, having gradually become manifest, demand for its improvement began to accumulate; and the Chief of the Survey, after his return from his reindeer reconnaissance in the territory in 1920, undertook the drafting of a new law providing for the administration of both the game and the land fur-bearing resources by the same authority. Great care was taken in the drafting of the bill, and the tentative draft was studied and criticized intensively during the period between 1920 and 1924, both by representative Alaskans and by such leading sportsmen's and nature lovers' associations in the United States as the Boone and Crockett Club, the Conservation Committee of the Camp Fire Club of America, the American Game Protective Association, and the National Association of Audubon Societies; as well as by many individual conservationists and sportsmen.⁵³ In this way a great amount of constructive criticism was obtained, and a measure finally evolved that was satisfactory to practically all parties. The result of this con-

⁵³ In a word, the finding of a solution was put up to the Alaskans and the Atlantic seaboard conservationists, the two elements that had been at loggerheads about Alaskan wild life for years.

structive work was the passage, January 13, 1925, of the "Act to establish an Alaska Game Commission to protect game animals, land fur-bearing animals, and birds, in Alaska, and for other purposes" (43 Stat. L., 739), best known by its short title of the "Alaska Game Law."⁵⁴ The fact that it was sponsored in Congress by the Alaskan delegate to that body is eloquent testimony of its acceptability to the inhabitants of the territory.⁵⁵

Before proceeding to a discussion of this outstandingly important statute, however, it should be pointed out that its essential object, the concentration of all wild life administration under one authority, was substantially attained six months before the law was formally enacted. The joint resolution of June 7, 1924 (43 Stat. L., 668), providing for the transfer to the Secretary of Agriculture of the powers and duties exercised by the Governor of Alaska with respect to Alaskan wild life under the 1908 law, was put through Congress on the last day of the first session of the Sixty-eighth Congress when it had become apparent that the Alaska game bill could not be reached in that session. The resolution also provided for the transfer to the credit of the Department of Agriculture of all money appropriated for the financing, for the fiscal year 1925, of game protection in Alaska under the 1908 law. In a word, the Survey, acting for the Secretary, was put in the position of the Governor under the 1908 law, which meant that there was now concentrated in it all Alaskan wild life authority—both as regarded game and as regarded fur-bearers. Steps were immediately taken to bring to an end the anomalous situation created by the existing dual warden force.⁵⁶ One force, known as United States game

⁵⁴ Neither the 1902 act nor the 1908 amendment thereto were given official short titles.

⁵⁵ Full territorial government with legislative power was not given to Alaska till 1912 (Act of August 24, 1912; 37 Stat. L., 512), subsequent to the 1902 law and its 1908 amendment. In giving it, however, Congress substantially reserved to itself the exclusive right to legislate upon a number of subjects, including game and fur-bearing animals.

⁵⁶ A force of game wardens had been created by the territorial government in accordance with the law of 1908. After the readjustment of 1920 the Survey established a fur warden force, consisting of one chief and eight deputies, with four employees of the Bureau of Education as co-operating deputies. In addition a warden and two deputies were stationed at San Francisco, Seattle, and Tacoma to watch for illegal consignments of furs. Previous to 1920 a fur warden force along somewhat similar lines had been maintained by the Bureau of Fisheries.

wardens, acting under one chief Alaska game warden, was created to enforce game laws and fur-bearing animal laws alike. In this way affairs under the Game Act proper, which was put through early in the following session, were enabled to get away, as it were, to a flying start.

The 1925 Alaska Game Law is an exceptionally skillful piece of legislation in that it provides for two exceedingly desirable objects which, in the years since 1908, had frequently appeared to be hopelessly antagonistic, and does it, moreover, without doing violence to either. That is to say, it establishes unity of control as to all forms of Alaskan land wild life⁵⁷ under the Biological Survey, and at the same time recognizes the healthy and in every way desirable Alaskan passion for home rule, and accords it a measure of power and influence which it had never theretofore enjoyed. Mr. Charles Sheldon, of the Boone and Crockett Club, long deeply interested in the fauna of the northern territory, and probably as well-informed as any man upon the history and the trending of American game protective legislation, declared at the time of the law's passage that it was a model game act, and that similar statutes would in time be adopted by the various states of the Union.

The law provides for a five-man commission, one member of the same to be the chief Alaskan representative of the Survey, and *ex officio*, the Commission's executive officer and fiscal agent. The other four members must be Alaskan residents not in the employ of the government, and each one of them must hail from a different one of the four judicial districts into which Alaska is divided. They are appointed by the Secretary of Agriculture, and may be removed by him for cause, with the privilege of a public hearing. The direct operation of the law may be said to be in their hands, as they have the appointment and control of all game and fur wardens, predatory animal hunters, and other employees. They submit the estimates for the annual appropriations for the enforcement of the act, subject to the revisory power of the Secretary of Agriculture. They have the sole right of issuance of licenses to hunt, trap, export, guide, possess arms (in the case of

⁵⁷ This phrase is intended to be inclusive of all birds, including water fowl, and all animals save seals, sea lions, walruses, etc.

aliens), and operate fur farms.⁵⁸ Certain of the regulations requisite for the operation of the law are their exclusive province. All others are made by the Secretary upon their recommendation or approval.⁵⁹ In short, it may be said that the effect of the law is to put the conservation of Alaskan wild life up to Alaska according to a general policy laid down by the central—and bill-paying⁶⁰—authority in Washington. The local interest of the Alaskans and the general interest of the nation as a whole would seem to be so well balanced and set off against each other in the law that undue selfishness on the one hand or the tyranny of a “distant and impersonal bureaucracy” on the other should be very unlikely to develop. Policy and good sense would seem to dictate forbearance and generous fair play on both sides.

The territorial courts thus far have shown a disposition to enforce the law with rigor. A number of heavy fines have been imposed for violations; and in some instances jail sentences have been added thereto. Recently a registered guide—necessarily an Alaskan appointed by Alaskans—had his license revoked for bad faith in allowing his party to kill game illegally.⁶¹

In bringing to a close this account of the development of governmental wild life control in Alaska it will not do to omit mention

⁵⁸ The Secretary of Agriculture retains, however, the right to issue permits for collecting and exporting for scientific, propagation, and exhibition purposes which he had possessed under preceding law (*Cf.* 1925 law, Section 8), and to make regulations concerning the same.

⁵⁹ To date five sets of regulations have been published. The first was published as a Service and Regulatory Announcement (A. G. C.—No. 1), “Alaska Game Law and Regulations and Federal Laws Relating to Game and Birds in the Territory,” May 12, 1925. The second was issued a year later as a Circular (No. 2) of the Alaska Game Commission. The third, fourth, and fifth were issued under the same title in May, 1927, and January and May, 1928, respectively. In each case the regulations became effective ninety days after publication. The series is to be a continuing one.

⁶⁰ That is to say, the greater part of it. The territorial legislature in 1925 appropriated \$10,000 to be used by the Commission in stocking various depleted districts with certain animals, principally fur-bearers. More recently it has been arranged to introduce buffalo from the Montana bison range into the Tanana Valley region in the interior of the territory.

⁶¹ It should be pointed out, however, that some rather severe criticisms of the working of the new law, emanating from Alaska, have already been made. See Annual Report of the Governor of Alaska for 1926, p. 6. A bill proposing a number of amendments to the act was introduced in the Seventieth Congress by Delegate Sutherland, of Alaska, who, it will be recalled, sponsored the act at the time of its passage. See 70 Cong. 1 sess., H. R. 335.

of a piece of legislation enacted in the last part of the second session of the Sixty-ninth Congress which may conceivably affect the Survey's activities in the territory. This is the act of February 10, 1927 (44 Stat. L., 1068), authorizing the creation of an *ex-officio* commission for Alaska, consisting of a resident officer from each one of the three departments of Interior, Agriculture, and Commerce—the commissioners to be selected by their respective department heads. Each one of these commissioners is to have general charge of all the activities in which his department is engaged in the territory to as great an extent as his appointing secretary may see fit to invest him.

The commissioners for the three departments have now been appointed for several months. The Department of the Interior is represented by the Governor of Alaska. The principal Alaska officer of the Bureau of Fisheries has been designated as the commissioner for the Department of Commerce. The Department of Agriculture's representative is the Chief Forest Service Officer for Alaska, the district forester in charge of National Forest District No. 8, the Alaskan district.

This last-named gentleman was selected for the agricultural commissionership in June, 1927. In January, 1928, the Secretary of Agriculture issued a memorandum⁶² setting forth the new officer's duties and defining the scope of the authority conferred upon him.

The Department of Agriculture's aim under the new law has been stated to be the facilitation of closer coördination of the Alaskan activities of the several bureaus having work in the territory. It is proposed to bring this about by the centralized handling of purchasing and accounting and personnel and property record-keeping for the separate organization units; by the pooling of the equipment and resources of the department; by the creation of a departmental spirit of team work with a unified viewpoint and general purpose.

In addition to providing for the *ex-officio* commissioners the law declares that the President of the United States may, if he sees fit, make one of the three commissioners supreme, and place in his hands all the powers of the entire commission. It would then be entirely possible for the President to make the Governor of Alaska,

⁶² Memorandum No. 579, January 26, 1928.

at present the representative of the Interior Department only, supreme as to the carrying out of all federal activities in the territory. So far the President has not seen fit to exercise this privilege.

The law also provides, mandatorially, for a study by the Secretary of the Interior of the present-day police and law enforcement agencies of the national government in the territory, with a report upon the expediency and propriety of their consolidation into a single force. This study was completed and a report made to Congress thereon, on May 12, 1928, advising against the proposed consolidation.

It will thus be seen that a possibility of the act is a unification of control of Alaskan affairs rather stronger than anything heretofore attempted.

Fur Resources and Fur Farming. The gradual gravitation into the jurisdiction of the Survey of the administration of matters concerning fur-bearing animals in Alaska was merely a symptom—though a rather outstanding one—of an economic development of prime importance resulting directly from that shifting in the balance of nature of which we have already noted more than one example in our consideration of the continuing change in wild life status inevitably resulting from the progressive utilization of the material resources of the country. Fur-bearing animals, in common with game animals, and game and non-game birds, have felt the constriction resulting from intensifying pursuit, lack of sufficient protection, greedy and unintelligent exploitation, and the disappearance of accustomed refuges and breeding grounds due to forest removal and marshland reclamation. And they have reflected it in “diminishing returns.” The point was finally reached where economic law, which had forbade their conservation in their days of primitive abundance, was constrained to demand it. It also made possible the beginning of their systematized propagation.

We need not bother here with attempting any nice determination of the precise time when that particular tide turned in America. For our purposes it will be sufficient to say that in the year 1887 two men on Prince Edward Island named Charles Dalton and Robert Oulton began, at first separately and then in conjunction, to experiment in the breeding of foxes with a view to raising in captivity the rarer sorts whose pelts command fancy prices in the

fur market, particularly black, or silver foxes. They made a success of the venture, and a new industry was thus created which, like all new industries of an out-of-the-ordinary nature, rapidly developed into a boom of the wildest description, nearly expired as a result thereof, and then gradually adjusted itself into comparative stability. At the present time silver foxes are being raised with fair success in practically every one of the northern tier of states from Maine to Washington, in the cooler portions of several of the other states, and at numerous points in Canada.

Fox-farming as inaugurated by Dalton and Oulton, and as followed to-day in the regions just mentioned, is exactly what the term indicates. That is to say, the foxes are raised in pens and enclosures on farms. Their range under these conditions is necessarily limited, and their feeding, breeding, and sanitation is carefully regulated. This method is different from the one which has developed in Alaska. There the raising of foxes on islands, where they are allowed to range at will and make their own dens, was practiced to some extent as long ago as the Russian régime; and it was, as we have seen, continued under the American authority, and was something of a going project several years before Dalton and Oulton began their experiments on Prince Edward Island. Its American beginnings in Alaska were on the Pribilofs. The Treasury authorities either started it there, or—what seems more likely—encouraged its development from a haphazard status in order to assist the natives of the island in gaining a livelihood.⁸⁸ Under encouragement the Pribilof experiment succeeded, and some individuals were thus impelled to try their luck on the “certain islands” the Treasury began to lease in 1882.

This early work in Alaska has been referred to as fox propagation. Fox encouragment would more nearly describe it. It simply consisted in turning a few good types loose on an island, allowing them to run wild and breed there, and then gathering the increase by trapping when the skins were prime. At first the foxes had to

⁸⁸ It is worth noting in this connection that the Department of Commerce, some years after the Pribilofs passed under its jurisdiction, had some reindeer put on the islands from the successful mainland herds for the same purpose. Reindeer were introduced into the Aleutians from the mainland in 1913-1914 in coöperation with the Treasury and Interior Departments.

rustle their own food. It was soon discovered, however, that an increasing output and better pelts could be obtained by systematic feeding.

The fox mainly raised in Alaska has been the blue fox, which is a color phase of the Arctic, or white fox, just as the silver fox, which is principally specialized in on the fur farms in Canada and the Continental United States, is a color phase of the common red fox. The history of the occupation of fox-raising in Alaska in its economic aspects rather closely parallels that already detailed regarding it elsewhere. There was initial excitement, a boom, a depression, and, finally, an adjustment to something like normality. To-day it is being followed successfully on a large number of islands all along the southern coast from Dixon Entrance clear around to the end of the Aleutian chain. Very few islands available for the industry are now left unoccupied,⁶⁴ and attempts are being made on the mainland, with at least partial success, to establish pen-breeding as practiced in the United States. As before stated, the major bulk of the business is concerned with blue foxes only. Some work is being done, however, with other varieties of foxes—silvers, crosses, whites, and reds—as well as with martens, minks, etc. According to the latest figures compiled by the Survey, there are now, in the Continental United States and Alaska combined, about twenty-five hundred fur farmers, the majority of whom are raising silver or blue foxes. The total investment in property and stock is between \$15,000,000 and \$18,000,000.⁶⁵ The corresponding Canadian figures are 2283 farmers and \$13,000,000.

⁶⁴ The Biological Survey has the leasing of the islands in the Aleutian group by virtue of that group being a bird reservation under its control. The Forest Service leases islands in the two Alaskan national forests. Until quite recently there was no authority for the leasing of the great numbers of islands in the public domain in Alaska, *i. e.*, those not in any government reservation. Many squatters, however, were utilizing numbers of these islands without permit. The Secretary of the Interior now has the right to lease these islands, as well as portions of the public domain on the mainland, for fur farming by virtue of the act of July 3, 1926 (44 Stat. L., 821).

⁶⁵ This figure represents mostly an aggregation of small-scale units, but large-scale operations have begun at a number of points. The biggest outfit so far is one in Wisconsin—a corporation owning and operating six farms. It specializes in silver fox and marketed 4089 pelts in 1925 at an average price of \$132 per pelt.

With the growth of the industry to this not inconsiderable figure from nothing in the course of forty years, the Biological Survey has had considerable contact, particularly in its later and more stable years. In the nature of things it was aware of it from the start and was keenly interested in it. Up to 1912 that interest, however, was more or less academic. The fox and fur farms in Canada were visited in 1907 by a representative of the Bureau. About the same time some investigations were made of the project of raising deer and elk on farms which was then attracting some attention, but which later petered out.⁶⁶ A bulletin was issued on this subject,⁶⁷ and statistics were compiled concerning it. Statistics were also compiled on state and national restrictions on the taking of fur-bearing animals at the request of trappers and others interested. An even closer contact with the direct taking of fur-bearers resulted from some slight regulation which had to be made of trapping on the Malheur and Klamath bird reservations, where various fur-bearing animals had increased because of the protection of the birds. Besides some few bulletins issued on fox farming, one was prepared on the modified form of fur farming represented by the protection of muskrat marshes. Some advice was also given regarding the raising of Belgian hares, which for a time about 1900 was a fad of almost furore proportions.

By 1912 the continued sharp advance in the price of furs, due to the continuing diminution in the returns from the taking of wild fur-bearers, had conclusively demonstrated that the systematized propagation of these animals in captivity or semi-captivity constituted the only possible solution of a rapidly developing economic problem. Scarcity stimulated high prices, which in turn tremendously stimulated trapping. A progressively narrowing circle was thus created, at the centre of which was total extinction.⁶⁸ As a result, the Survey was commissioned to make a study of fur

⁶⁶ That is to say, it has as an activity extensively engaged in. There are still such farms, however, some of them of considerable extent. Very recently a grazing and breeding association in Massachusetts purchased 388 elk from the National Bison Range in Montana, moved them east by special train, and installed them successfully on their property.

⁶⁷ "Deer Farming in the United States." *Farmers' Bulletin* 330. July 29, 1908.

⁶⁸ To illustrate the change that has occurred in fur prices—John Jacob Astor invoiced a lot of six thousand coon skins to London in the early part of the last century at thirty cents per skin. To-day coon skins bring \$14.

farming, which was still generally regarded, save at one or two of the older established farms on Prince Edward Island, as being in the experimental stage. An appropriation of \$40,000⁶⁹ was made for the purpose in the Agricultural appropriation act of August 10, 1912 (37 Stat. L., 269, 292, 293), under the food habits clause. The work was begun coöperatively with the National Zoological Park in Washington, D. C., where experiments were started in the penning, feeding, and rearing of minks. These experiments at the national zoo were continued until 1917. Work with the minks was also started on a mink farm established near Prichard, Idaho, in the Cœur d'Alene National Forest in 1913. Work with martens was begun at a station established at Linden, Maryland, in 1915. In 1916 a farm was leased at Keeseville, Essex County, in the northern part of New York, and equipped for work with a variety of animals, including, in addition to minks and martens, blue foxes, fishers, and skunks. All work was centered here in 1917, the other experiments being discontinued. Besides the actual experimental work, contact was maintained with the successful establishments in Canada, and the development of the island ranching in Alaska was studied on the ground.⁷⁰ A number of publications were issued dealing with various phases of the work, and in particular the initial issue was made, in 1915, of what has come to be one of the most important publications of the Survey—the annual bulletin of *Laws Relating to Fur Animals*.⁷¹ Contact with the fur farmers of the United States and Canada was gradually established, as well as with the various branches of the fur industry, and with the Canadian governmental agencies concerned with fur-bearing animal conservation. Besides the experiments in breeding, feeding, etc., studies were made of the structure and quality of furs, and

⁶⁹ The total sum appropriated was \$43,000, but it was provided that \$3000 of this amount should be expended for the destruction of ground squirrels on the national forests in California in connection with the development of the work in noxious animal control.

⁷⁰ The Bureau of Fisheries during the period it was in control of Alaskan fur-bearers, 1903-1920, did considerable experimenting and investigating with regard to the practical aspects of Alaskan fox raising. To a lesser degree the Treasury Department did also before the fur-bearing animal jurisdiction passed from it; particularly in connection with the work on the Pribilof Islands.

⁷¹ The most recent issue of this publication, "*Fur Laws for the Season 1927-28*," was issued in October, 1927, as *Farmers' Bulletin* 1552.

of the parasites and diseases afflicting the animals. Investigations were also made into the economic value as fur-bearers of some of the less regarded animals. It was thus developed that the annual fur value of the more or less despised skunk was \$3,000,000.⁷² It was also pointed out that in 1919 something like \$60,000 was paid over to American farm boys for skins of moles.⁷³

Studies were likewise made by the Survey on specially protected streams and marshes of certain valuable fur-bearers, such as the muskrat and the beaver,⁷⁴ incapable of being profitably propagated within the limited confines of the ordinary fur farm; effort being made to put before the farmer the possibilities in utilizing the ordinary farm for the production of fur to be harvested in off agricultural seasons.⁷⁵ And particularly was it sought to be pointed out to all directly concerned—trappers, raw fur buyers, fur dressers and manufacturers, and national and state officers—that it was to the interest of all, to further fur animal conservation by co-operating for the establishment of open seasons based upon the contemporary fitness of the pelts, and for the suppression of the traffic in unprime and contraband furs.⁷⁶

The more strictly scientific investigational work at the experimental fur farm proceeded steadily along the lines already indicated, and within the past few years some facts of importance have been brought out that cannot fail to be of vast benefit to the new industry. Thus, the demonstration in 1923 of the extreme deadliness of hookworm among foxes brought about the establishment of quarantine regulations by the Department of Agriculture prohibiting the importation of breeding stock⁷⁷ infected with this disease. More recently it has been demonstrated that effort to

⁷² See "Economic Value of North American Skunks." Farm. Bull. No. 587.

⁷³ See "American Moles as Agricultural Pests and as Fur Producers." Farm. Bull. No. 1247.

⁷⁴ See "Beaver Habits, Beaver Control and Possibilities in Beaver Farming." Dept. Bull. No. 1078. Also "Beaver Habits and Experiments in Beaver Culture." Dept. Agric. Technical Bulletin No. 21.

⁷⁵ See "Trapping on the Farm." Yearbook, 1919.

⁷⁶ See "Maintenance of the Fur Supply." Dept. Circ. No. 135.

⁷⁷ Several thousand foxes for breeding, mostly silvers, are annually imported from Canada.

breed out the so-called "Samson"⁷⁸ quality in foxes is futile. A comprehensive publication upon the breeding of the silver fox was published in 1923.⁷⁹ In 1924 the experimental farm at Keeseville was given up and a new place was leased near Saratoga Springs in the same state and equipped with modern buildings, pens and dens, and improved laboratory facilities.⁸⁰

Since this change work has been continued along the lines already described,⁸¹ and, in addition investigation has been made of the rabbit breeding industry, both at the farm and in the centers of the industry throughout the country. This industry, which in a way is a development out of, or an adjustment of, the Belgian hare raising craze of several years ago, has of late attained considerable proportions, particularly on the Pacific Coast, where rabbit meat has become very popular. In Los Angeles alone a million dollars worth is sold annually. Three slaughter houses in the same city are occupied exclusively with the preparation of rabbits for market. The pelts also are in ready demand.⁸² In order to keep pace with the constantly growing demand for information with regard to rabbit growing, the Survey has been compelled to appoint a special assistant who devotes the major portion of his time to rabbit investigations.⁸³

When the Survey was given the fur-bearing animal jurisdiction in Alaska in 1920 the work in fur resources investigations, which had been under way since 1912, naturally became of much greater bulk and importance. The Survey was charged not only with the regulatory side involving the enforcement of the laws and regulations for the protection of the fur-bearers of the territory,

⁷⁸ A Samson fox is one which lacks the guard hairs without which a skin is valueless.

⁷⁹ See "Silver Fox Farming," Dept. Bull. No. 1151.

⁸⁰ Beginning November, 1927, the farm, in common with all similar establishments of the Survey, has been called an experiment station.

⁸¹ See Biological Survey Leaflet No. 6, "Experimental Fur Farm of the Biological Survey," July, 1927. Also Leaflet No. 8, "Mink Raising," pub. Oct., 1927.

⁸² See "Rabbit Skins for Fur," Farm. Bull. 1519.

⁸³ See Biological Survey Leaflet No. 4, "Raising Domestic Rabbits," March, 1927. Since the publication of this leaflet the Survey, in coöperation with the National Rabbit Federation and the Fontana Farms Co., has established a rabbit breeding experiment station at Fontana, California, fifty miles from Los Angeles, in charge of the special assistant above referred to.

but also with the investigation and encouragement of the fur propagation industry, in which activity it had theretofore had only the rôle of observer. In undertaking this latter side of the work in Alaska, no attempt has been made at any radical innovations. The system of leasing which had been worked out by the Bureau of Fisheries for the islands it had inherited from the Treasury has been continued in force. That is to say, these islands are leased to the highest bidders for five-year terms at rentals amounting to about \$200 per year. With regard to the Aleutians a somewhat different plan has been adopted. In order to create as much uniformity as possible throughout the entire fox island region, the Survey and the Forest Service entered into a coöperative agreement whereby the islands in the national forests are rented by the Forest Service, and the islands in the Aleutians by the Survey, at similar rates and under similar restrictions. Twenty-five dollars per year per island is charged for the first three years; after that at readjusted figures to be determined.⁸⁴ The two bureaus interested have also coöperated to bring about periodic meetings of the fox breeders for discussion of the problems and needs of the industry. From this there has resulted, with the encouragement and assistance of the bureaus, the formation of four breeders' associations.⁸⁵ These coöperative efforts have been found to be of great advantage, not merely to the farmers but also to the Survey in its efforts to further the industry. They have simplified the work of the Survey experts on their visits to the fox raising regions, and they have brought out the difficulties in need of adjustment. As an instance may be cited the regulation promulgated in 1923 forbidding the killing of blue foxes "in the wild" in regions of the Alaska mainland contiguous to the fox farming islands. This regulation was adopted because of the complaint of the island ranchers about poachers, who were in the habit of raiding the islands, and then declaring that the pelts they offered for sale had come from animals killed at large on the mainland.

⁸⁴ Indians desiring to raise foxes are allowed islands rent free.

⁸⁵ Southeastern Alaska Blue Fox Farmers' Association, at Juneau; Blue Fox Farmers' Association of South Central Alaska, at Cordova; Cook Inlet Silver and Blue Fox Breeders' Association, at Seldovia; Southwestern Alaska Blue Fox and Fur Farmers' Association, at Kodiak.

The results of the work done so far in connection with Alaskan fur propagation have been embodied in a recently published bulletin of comprehensive scope.⁸⁶ A list of the fur farms in the territory giving location, name of owner, and animals specialized in has also been published.

The Survey in its work in connection with fur resources and fur farming has declared a policy of coöperation and coördination, rather than one of control. The great object it has in view is not bureaucratic aggrandizement but such an adjustment of the utilization of the fur resources of the country that those resources may be continuing rather than diminishing. To this end it has sought to encourage the formation of such associations as those just mentioned in connection with Alaska. It has thus been instrumental in the formation of several fox breeders' associations in the United States; also of associations relating to other phases of the fur industry, for example, the recently-formed Rabbit Breeders' Exchange in New York City. The theory back of this encouragement has not been the mere business benefit of the industry alone, but the furtherance of sound conservational thought through the added stability and the more exact knowledge inevitably resulting from organization.

This coöperative policy has been the means, within the past year, of inaugurating a piece of work the results of which should be of the greatest value to the fur trade and practical wild life conservation alike. This is the beginning of the assembling, by the Survey and the National Association of the Fur Industry in coöperation, of that reliable statistical information relating to fur resources and the fur trade that has hitherto been unavailable. It is purposed "to establish a file of information regarding the distribution and conservation of fur-bearing animals, particularly in North America, together with laws for their conservation; to assemble collateral information of use in conserving fur-bearers and building up the number of these useful animals; and to lay the foundation for a statistical presentation of past and present conditions in the fur trade." The first result of this work was published in the Yearbook of the National Association of the Fur Industry for 1925, "A Preliminary Study of Statistical Data of Fur Resources and the Fur Trade."

⁸⁶ See "Blue Fox Farming in Alaska." Dept. Bull. 1350. October, 1925.

It is planned to continue this statistical study over a period of time until sufficient data are gathered concerning the fur supply and the fur industry to make possible accurate analyses to serve as aids to legislation in the enactment of fur laws⁸⁷ and to furriers in the conduct of their business.

Conclusion. The extension of the Survey's activities to Alaska resulting from the laws of 1902, 1908, 1920, and 1924-25, and the definite entry of the Survey into the field of fur-bearing animal investigation in 1912, naturally resulted in a considerable enlargement of duties and responsibilities which called for readjustments, and the creation of special instruments for the efficient carrying out of the new work. The scientific work in connection with the reindeer, therefore, together with the enforcement work in connection with the laws protecting Alaskan fur-bearers, and the furthering of the Survey's Alaskan fur-farming policy, was made the responsibility of a new division which began to function in 1921. Three years later, in 1924, another new division was set up to exercise general supervision of the investigational side, both in Alaska and the United States proper, of the country's fur resources. Its immediate object was the maintenance of the fur supply, from both wild and controlled sources, to the ultimate end that the fur industry as a whole might enjoy a continuing development. It aimed to do this through scientific experiment investigation in connection with fur farming, and through close coöperation with all elements of the general fur trade from trapper to furrier.

The formation of this new division, together with the transfer of direct wild life control in Alaska to the Alaska Game Commission, necessitated an adjustment of the Alaskan Division which had been set up in 1921. Its reindeer activities remained as they had been. Otherwise, there were some changes. Its direct regulative functions passed to the Alaska Game Commission and its touch with such functions came to be of an advisory nature. The principal Biological Survey officer in Alaska, who, as we have seen, is an *ex-officio* member of the Commission, represented this Division in

⁸⁷ Need for such legislation would seem to be indicated by figures gathered by the Survey on the catch during the last two seasons of fur trapping. According to these figures the 1925-26 catch was 20 per cent less than 1924-25; and 1926-27 showed an even greater decline.

particular, as he represented the Survey in general. The effect of this arrangement was to make this Division a sort of liaison authority between Alaska on the one hand and the nation as represented by the Survey on the other. In order that its coöperation might be efficient and useful, it made field studies of the habits and distribution of the valuable wild life of Alaska. In other words, in great measure, it acted as the consulting expert of the Commission. And apart from this it conducted investigations for the promotion of fur farming on the islands within its jurisdiction, and administered the leasing of these islands. Later it began to do similar work in connection with the encouragement of sheep grazing on some of the larger islands.

The formation of these two new divisions stands for the latest manifestation of that distinct economic, practical trend in governmental biological work which has been going forward with especial rapidity during the past quarter-century as a result of the ever-changing condition of the country due to material utilization. Accumulating experience and necessity have made imperative a change of emphasis from the merely scientific to the practical founded upon the scientific—a change that has come about gradually, but the completeness of which can be made to stand out vividly by comparing the viewpoint of the eighties and early nineties, when complaint was made of emphasizing “the more purely economic phases of the work,” and scientific work was declared to be “equally or even more important,” with the following recent declaration of the Survey’s *raison d’être*:

The Biological Survey deals with the conservation and increase of game, fur-bearing animals, and birds, and with the control of bird and mammal pests. Recent investigations reveal the fact that in the aggregate, wild life resources, capitalized on the basis of a 6 per cent annual income, represent an enormous sum, possibly exceeding a billion dollars, and through intelligent management are capable of a great increase. On the other hand, certain forms of wild life, as the stock-killing wolves and other predatory species, with many rodents, as the house rat, prairie dog and others, annually destroy forage crops and other property exceeding \$500,000,000 in value, a loss which may be largely prevented by properly directed efforts.⁸⁸

⁸⁸ Biological Survey, Annual Report, 1922.

In 1900, the year the Lacey Act was passed, the Division of Biological Survey was still engaged in two lines of work: Geographic Distribution and Economic Relations, the bulk of the last-named work consisting of the examination and tabulation of the contents of the stomachs of birds. The bulk of the field work done was in connection with the purely scientific work in geographic distribution. The total appropriation for all work was \$17,500, slightly over one-third of which was spent on economic relations. This does not include salaries.

In 1901 a new section was added to take care of the new economic work made necessary by the Lacey Act—the section having to do with the supervision of matters relating to the protection of game, the importation of foreign birds and mammals, the investigation of game bird propagation and distribution, and the direct importation of game birds by the government for the restocking of depleted covers and for the introduction of new species of game birds into areas suitable for their development and increase. It might be said in passing that it has been found as a practical matter that such importations by the government are unnecessary, the work of introduction being thoroughly done by interested individuals and game associations. No serious effort, therefore, has been made by the government to carry out any of the activities authorized by Section 1 of the Lacey Act save those having to do with the making of scientific investigations regarding game bird life, the giving of advice in connection therewith, and the assembling of statistics and information. A system of inspecting importations of foreign birds and animals was devised and put in operation in this year under the direction of the Treasury Department, the fees for inspections by naturalists qualified for the work being paid by the parties making the importations; and permits from the Survey being necessary in all cases to the passing of the importation by the Treasury Department officers.

As to the balance of the Lacey Act—those provisions having to do with the sending about the country through the channels of interstate commerce of game illegally killed or shipped—the work of the Survey during the first few years was necessarily one of coöperation rather than direct enforcement; necessarily because

it was not given the wherewithal for direct enforcement. In 1906, for example, we read that

In this connection the fact cannot be too strongly emphasized that the Department has never had the means to properly discharge the duties placed upon it by the Lacey Act.⁸⁹

The best that could be done, in other words, was to bring to the attention of local authorities, and the Department of Justice, whenever possible, violations of the law that came to the Survey's attention. In this way, however, much excellent work was done; for example, when a bit of information received by the Survey in September, 1900, only a few months after the passage of the act, was the means of putting the entire wholesale feather trade of Baltimore on the side of strict law observance with regard to the matter of plumage. This information was referred to the Maryland authorities and led to the seizure in the possession of a large wholesale house of the skins and feathers of some twenty-six hundred gulls and terns. The seizure was made by the Game and Fish Commission of Maryland.

As a result of this seizure and the following criminal prosecution the wholesale plumage dealers of Baltimore asked the Survey to examine their stocks and voluntarily withdrew all prohibited plumage in their possession, including grebes' breasts and herons' aigrettes.

Excellent work done by the United States Attorney in St. Paul in 1904, resulted in the securing of a conviction in a case involving the shipment of game to Portland, Oregon, from St. Paul. Cordial coöperation was offered by the state game wardens of Minnesota and Oregon. Similar coöperation in 1906-07 between the authorities of California, Wyoming, and Idaho resulted in the breaking up of a gang of tusk hunters who had been shipping elk teeth, antlers, and hides from the Yellowstone Park country. It being recognized early that coöperation of this sort would be greatly furthered through the wide dissemination of knowledge regarding the game laws and the public agencies and private organizations interested in their enforcement, the Survey began the distribution in 1900 of two pamphlets which have come to be

⁸⁹ *Ibid.*, 1906, p. 22.

among the most important annual publications which it produces. "Game Laws for the Season 1927-28,"⁹⁰ a summary of the provisions of national, state, and provincial⁹¹ statutes relating to game, is the twenty-eighth issue of a publication which has been of very great benefit in spreading throughout the country a simple and understandable statement of that which can, and that which cannot, be done in connection with the killing and taking of wild life. Likewise the twenty-eighth issue of the "Directory of Officials and Organizations Concerned with the Protection of Birds and Game"⁹² has been of immense value to law enforcement by putting in touch with each other all the elements in the country interested therein.

With some minor modifications the section organization of the Survey as already described continued in force till 1914. To Section 3, having in charge the supervision of matters relating to the protection of game, there was delegated in 1903 the further duties—economic ones all of them—involved in the carrying out of the "Egg Act" and the Alaska Game Law of 1902, and also in the protection of the bird refuges, the first one of which, as will be recalled, was established in 1903. In 1905 the Survey became a Bureau and its sections became divisions. For one year, 1905, they were four in number instead of three because of the division of the work in economic relations between birds and mammals. In 1906, however, birds and mammals were "run together" again and the three-division system was maintained till a fourth division was added in 1914 to carry out the Migratory Bird Law of 1913—an added duty which was likewise economic rather than scientific.⁹³

Meantime, some further slight changes had occurred to which brief notice must be given. For example, in 1906, the system of requiring the importers of birds and mammals to pay the fees for

⁹⁰ Farmers' Bulletin No. 1550. The Department also publishes the information contained in this bulletin in poster form. Cf. Poster No. 46 (Bi), issued July 26, 1927.

⁹¹ Added, of course, after the passage of the Migratory Bird Treaty Act.

⁹² Dept. of Agric. Misc. Pub. No. 6, September, 1927. The publication was a Biological Survey Circular from 1900 to 1914; a Biological Survey Document 1915-1918. From 1919 to 1926 it was a Department Circular.

⁹³ Of course it was regulatory also, as was the work connected with the 1902 Alaska Game Law; but the basis of the regulation involved was purely economic.

the expert inspection of their importations at the ports of entry was discontinued as a result of an explosion of the resentment of the assessed class against the charge, which resentment had been accumulating from the time of its first imposition. Thereafter the fees were paid by the government out of appropriations.

In the following year, 1907, there occurred that shift of emphasis back to the economic which has heretofore been examined at length. Economic Relations, basically because of the pressure brought about by the tremendously increased utilization of our natural resources in general, directly because of the fight against the challenge of predatory and noxious animals, into the forefront of which the Survey had been pushed by the demand of the great interests most immediately menaced, became openly and unreservedly the Survey's major concern, Geographic Distribution, representing what we may term scientific relations, falling back into a secondary rôle. The purely scientific nature of this work which had been the Survey's principal interest from the late eighties to the early 1900s was emphasized in 1911 by a change in designation, when what had been called geographic distribution was relabeled biological investigations,⁹⁴ consisting of work in biological surveys and reconnaissances, studies in bird migration, identification of specimens for colleges, experiment stations, and individuals, and the publication of treatises founded on the data so accumulated in the series known as North American Fauna. To this section of the Survey, several hundred voluntary bird observers in all parts of the country still reported, many of whom had been doing this work continuously since 1885. It took the leading part in 1910-12 in a biological survey of the Canal Zone organized by the Smithsonian Institution. A significant comment upon its changed relation to the Survey as a whole was made in 1912, when it was said that

a vast amount of information concerning the bird and mammal life of the United States has been gathered by this section, and this is of great value in connection with the efforts being made to

⁹⁴Reference is made to the designations employed in the official reports of the Bureau. The phrase "biological investigations" had been used for many years, however, beginning in 1894, in the annual appropriation acts to describe all the work done—economic relations as well as geographic distribution.

protect and encourage useful and harmless species and to eliminate injurious ones.⁹⁵

The work done in connection with bird observation by this part of the Survey was enlarged in 1914, when the beginning in a new continuing activity was made—the annual taking of bird censuses through the existing force of voluntary bird observers and others enlisted for the purpose.⁹⁶

In 1916 the functional line-up of the Survey underwent a further enlargement, as follows:

1. Investigation of the food habits of North American birds and mammals in relation to agriculture
2. Biological investigations, with special reference to the geographic distribution of native animals and plants
3. Supervision of reservations for native birds and mammals and the preservation of native wild game
4. Enforcement of the Lacey Act regulating the importation of birds and mammals and the interstate shipment of game
5. Administration of the Federal Migratory Bird Law.

Concerning the second of these divisions, it was stated in that same year that

biological investigations have been conducted mainly along lines essential to the effective administration of various other activities of the bureau, including the Federal Migratory Bird Law; the enforcement of the Lacey Act, regulating importations and interstate shipments of birds; the maintenance of bird and mammal reservations; and the economic investigations concerning the relations to agriculture, stock-raising and forestry.⁹⁷

Which was equivalent to saying that the scientific function had become the mere auxiliary of the "more purely economic phases of the work," a development which Dr. Merriam had probably foreseen when he had said, eight years earlier, that

⁹⁵ Biological Survey, Annual Report, 1912, p. 13.

⁹⁶ See Dept. Bull. 187, "Preliminary Census of the Birds of the United States, 1915"; Dept. Bull. 396, "Second Annual Report of Bird Counts in the United States, with Discussion of Results, 1916"; Dept. Bull. 1165, "Report on Bird Censuses in the United States, 1916 to 1920"; also Dept. Circ. 261, "The Purpose of Bird Censuses and How to Take Them."

⁹⁷ Biological Survey, Annual Report, 1916, p. 6.

we could not do satisfactory work in our other lines without a foundation based on these technical studies.

The 1916 scheme of organization lasted till 1919, when the work in connection with the enforcement of the Lacey Act and that having to do with the administration of the migratory bird laws, became the responsibility of a single division.

A glance, at this point, at what the varied activities of the Survey had come to cost will be illuminating. We have seen that in 1900 approximately three times more was spent on scientific work than on economic work, and that the total spent for all lines was less than \$20,000. By 1909 there had been a great reversal in these proportions, and a great enlargement in the total. In that year there was appropriated for the Survey, exclusive of salaries, \$74,420, of which \$18,000 was for biological investigations. In other words the proportions had shifted from 3 to 1 to 1 to 4. Seven years later, in 1916, the proportions had become 1 to 20, but \$26,500 out of a total of \$534,000 going to scientific work. In 1921 it had become 1 to 30, the Survey appropriation as a whole being \$742,255, of which \$24,400 went for biological investigations, the sphere of which had meantime become slightly enlarged when the work in bird banding,⁸⁸ which had theretofore been conducted by a private organization, the American Bird Banding Association, was taken over by the Survey in 1920.

The year for which appropriation figures have last been quoted, 1921, may be said, approximately, to mark the time of the further shift to the still more advanced economic policy of the Survey of to-day. The formal organization remained practically what it had been in 1919—with the addition of the new division administering Alaskan reindeer and fur-bearers hitherto described. That is to say, there was a division concerned with economic investigations, another with biological investigations, another with the administration of the reservations and refuges, another with the admin-

⁸⁸ The placing upon the legs of birds, trapped and subsequently released, of aluminum bands bearing numbers or symbols by which the place of banding can be established should the bird be later killed or recaptured. In this way data of vast importance relative to bird migration can be accumulated. See Dept. Circ. 170, "Instructions for Bird Banding," and Dept. Bull. No. 1268, "Returns from Banded Birds, 1920 to 1923." See also the article in the *National Geographic Magazine*, January, 1928, "Bird Banding: the Tell-Tale of Migratory Flight," by E. W. Nelson.

istration of the Migratory Bird Treaty and Lacey Acts, and, finally, the new division concerned with Alaska. Nevertheless, some vital changes from the 1919 status are to be noted. In Economic Investigations, for example, the determining of the food habits of birds now occupied a definite back seat in comparison with the control of undesirable animal life. Furthermore, the Division had acquired several additional concerns. It was now concerned with fur farming, with the control of injurious birds species, and with the study of the food of reptiles and amphibians as well as with that of birds. One thing it had lost. The study of the food of mammals had been transferred to the Division of Biological Investigations. The Division was still an economic division, and it spent more money than any other part of the Survey, but it was no longer concerned primarily with the economics of avian relationships. It was overwhelmingly concerned with predatory and noxious animal control.

In short, by the beginning of the 1920s the fourth phase in emphasis in the Survey's history had been fully entered upon. There had been the emphasis of economic ornithology, then that of geographic distribution, then the somewhat qualified return of that of economic ornithology, and finally there came the phase of to-day, the one concerned primarily with the protection of game and desirable species of birds and animals plus the repression of undesirable species.

Between 1921 and the time of the present writing, July, 1928, the work of the Survey has proceeded, in general, along substantially the lines which had come to be laid down by the first-named year. There has been some adjustment and division of duties, however, which we shall note in bringing this chapter to a conclusion.

Economic Investigations, for example, ceased to be concerned with work in connection with the food habits of birds in 1922, the work going in that year to the newly-organized Division of Food Habits Research. Again, in 1925, it lost the fur-farming work when the Division of Fur Resources was created as hereinbefore detailed. The work in economic relations to-day consists of studies of the economic relations of wild mammals and of effective methods of controlling their depredations in areas devoted to agricul-

ture, stock-raising, horticulture, and forestry; and of the furnishing of leadership for coöperative campaigns for the extermination of predatory animals, destructive rodents, and other injurious species.

The Division of Food Habits Research just referred to was organized in 1922 to take over the work in the examination of the stomach contents of birds, theretofore performed as part of the work in economic investigations. In addition it began to make stomach examinations of reptiles, amphibians, and mammals, particularly those of predatory animals killed by the Survey hunters in the field. In 1923 it added to its duties the study of the food resources of water areas supporting migratory wild fowl. It also began the devising of practical methods of control of injurious birds. To it likewise was assigned, in 1924, the Survey's end of the responsibility in the important "coöperative quail investigation," begun in that year at the instance—and very largely at the expense—of a group of estate owners in southern Georgia and northern Florida, and which, when completed, will have been the most thorough study of life history that has ever been made of an American game bird.² In 1925 it made studies of the game bird farming industry as practiced at various points in Virginia, New York, Pennsylvania, and New Jersey. Its duties to-day include the lines just indicated.

The work in Biological Investigations is, with some slight changes, what it was in 1921. Then it comprehended investigations covering the distribution, habits, and migrations of North American birds; the food, habits, and distribution of mammals; the investigating and mapping of the life zones; and the study of both birds and mammals in the laboratory. The food studies of mammals were transferred to it in 1921¹ from Economic Investigations, and was retransferred to Food Habits Research in 1922.³ In 1925 it was given special charge of some experiments on Sapelo Island,

² See "Progress on Coöperative Quail Investigation: 1924," and "Report on Coöperative Quail Investigation: 1925-1926," both pamphlets published by the Committee Representing the Quail Study Fund for Southern Georgia and Northern Florida.

¹ Biological Survey, Annual Report, 1921, p. 19.

³ That is to say, the bulk of it was. The detailed microscopic work is now done by Food Habits Research. Some stomach examination, however, is necessarily done by Biological Investigations in the course of its own special work, just as some is also performed by Economic Investigations.

off the coast of Georgia, in the introduction, at the expense of Mr. Howard Coffin, of Detroit, of certain game birds from Central America, including curassows, ocellated turkeys, tinamous, and chachalacas.³ Finally, in 1927, there was transferred to it the work having to do with the improvement of the reindeer herds in Alaska and with the miscellaneous wild-life investigations in that region which had been done by the Division of Alaska Investigations since 1921.⁴ Its work has recently been described as comprehending field and laboratory studies of all the wild life of the country, mammals, birds, reptiles, amphibians, and the more characteristic native plants. This includes technical investigations to determine the classification of species, and their life habits and distribution, including the migratory movement of birds, for the purpose of mapping the natural life zones of the country and supplying fundamental scientific information as the necessary basis for the economic, regulatory, and other activities of the Survey.

On July 1, 1928, the Division in charge of the supervision of the eighty national game refuges and bird reservations⁵ was abolished, and its functions were placed with the Division administering the Migratory Bird Treaty and Lacey Acts. Those functions include the maintenance of the reserved areas and their protection by warden service, the production of hay on the lands comprising the

³ See Commissioner of Agriculture, Annual Report, 1888, pp. 484-88, for account of the introduction of Mongolian pheasants.

⁴ The Division of Alaska Investigations was abolished in 1927, its functions being divided between the Division of Biological Investigations—as related above—and the Division then administering the game and bird reservations. The functions going to the last-named Division are those having to do with the relations of the Survey to the Alaska Game Commission, with the preparation of regulations under the Alaska Game Law, and with the issuance of permits for fur farming and grazing on certain of the Aleutian Islands. More recently this last-named Division, along with the Alaska functions, has been merged into the Division administering the Lacey and Migratory Bird Treaty Acts.

⁵ A complete list of these reservations, with a map of those in the Continental United States, will be found in the appendices. The reservations without the Continental United States are located in Alaska, Porto Rico, and on certain islands in the Pacific Ocean, including Laysan Island. The Survey has sent three expeditions to Laysan: in 1911 (in coöperation with the University of Iowa), 1913, and 1923. See Biological Survey Bulletin No. 42, "Report of an Expedition to Laysan Island."

Jackson Hole Elk Refuge in Wyoming,⁶ the restocking of the reservation and the disposal of surplus animals therefrom by sale or distribution to other areas, municipal parks, etc., the administration of the upper Mississippi River Wild Life and Fish Refuge Act (in conjunction with the Bureau of Fisheries), the administration of the act protecting wild life and public property on wild-life refuges, and the Alaska work which was not transferred to the Division of Biological Investigations when the Division of Alaska Investigations was abolished in 1927; that is to say, the handling of the Survey's relations with the Alaska Game Commission, the preparation of regulations under the Alaska Game Law, and the issuance of fur farming and grazing permits on certain of the Aleutian Islands.

The reason for the merging of these two divisions was a desire to place all of the Survey's regulatory activities under a single control. The chief of the abolished division has been transferred to purely scientific work, in which he has had long experience. The new division, which has the handling of four major regulatory statutes directly, and of one other indirectly,⁷ is known as the Division of Game and Bird Conservation.

The five Divisions of Biological Investigations, Economic Investigations, Food Habits Research, Fur Resources, and Game and Bird Conservation make up the Biological Survey as it is to-day; a governmental Bureau of the first rank, handling affairs of great scientific, educational, social, and, above all, economic importance throughout the United States and its outlying posses-

⁶ The area of this refuge is slightly over 4500 acres; comprising the original governmental refuge formed by the purchase of 1760 acres of ranch lands and the setting-aside of 1000 acres of public lands, and an additional area of 1760 acres purchased by the Izaak Walton League in 1925 and presented to the nation for incorporation in the established refuge in 1927 (see J. Res. of February 25, 1927; 44 Stat. L., 1246). The purchase of some 9000 additional acres has recently been recommended by a commission appointed by the President's Committee on Outdoor Recreation. Of the other four big game refuges, Sullys Hill and the National Bison Range have not been increased in area since their establishment. Wind Cave was doubled in size in 1927. Niobrara has been twice enlarged by executive orders in 1912 and 1920 to its present area of some 16,000 acres.

⁷ The Upper Mississippi Refuge Act, the act protecting birds and animals on reservations, the Migratory Bird Treaty Act, and the Lacey Act directly; the Alaska Game Law indirectly.

sions, and spending in the process a total of \$1,165,000⁸—a somewhat impressive contrast to the \$5000 given to the Entomological Division forty-two years ago for the beginnings of work in economic ornithology.

With the passing of the years the Survey has grown far away from its original stature and purpose. The evidence in the case would seem to indicate that that development has been natural and inevitable, that the results thereof have been good, and that the Survey has justified its existence in many ways besides the protection of the West from rabid coyotes—the modest claim put forth by Dr. Nelson a few years ago.

At the same time it is only just to point out that there is no little divergence from this point of view, even among naturalists. To give an up-to-the-minute illustration, a very distinguished naturalist⁹ has recently taken sharp issue with the Survey's claim that great good has resulted from the the acts for the protection of migratory wild fowl and the measures adopted thereunder. To the Survey's claim of a great increase in the numbers of wild fowl he counters with the statement the assembling of great numbers of the birds during their flights gives no basis for the assumption that they are multiplying; in fact, statistics show to the contrary.¹⁰

A somewhat serious charge, if capable of substantiation. It should be borne in mind, however, that doctors are not the only folks

⁸ The total appropriated for the Survey in the Agricultural appropriation act of May 16, 1928 (45 Stat. L., 539, 558). This sum is inclusive of salaries, and of appropriations for the purchase of lands for the Upper Mississippi Wild Life and Fish Refuge during the fiscal year 1929. Of this appropriation, \$45,000 is accorded the work in Biological Investigations—about one-twentieth of the expenditures for objects not purely scientific. For the "food habits" clause, including, besides rabies suppression and predatory and noxious animal work, the work in fur resources and in food habits research, there is appropriated no less than \$662,000—more than half the total appropriation for the Survey, including salaries. Of this \$662,000, approximately eight-tenths goes for predatory (including rabid) and noxious animal control. In addition, as noted elsewhere, the second deficiency act of May 29, 1928 (45 Stat. L., 883, 895), appropriated \$200,000 for the creation of the Bear River Refuge.

⁹ Dr. William T. Hornaday, ex-Director of the New York Zoological Park.

¹⁰ *Saturday Evening Post*, November 27, 1926, p. 28.

who occasionally disagree. Scientists and scholars do also; sometimes with vehemence.¹¹

Another illustration of the difference of opinion among men presumably in the know is furnished by the wild turkey. This bird unquestionably does not exist in its old-time abundance. But as to the hopefulness, or lack of it, of its present status there are views and views. The President of the National Association of Audubon Societies takes a pessimistic view, and says that "as a game bird the wild turkey has practically ceased to function." But an officer of the Forest Service, intimately conversant with game conditions in the West, says that to-day with only partial protection wild turkeys are rapidly increasing in the forests of that region.¹²

There has also been considerable dissatisfaction with the Survey on the part of the game-breeding fraternity. It has been said that Congress is unwise in delegating "to Doctors of Natural Science, who are busy investigating the habits of insects, and other natural objects, the right to make too many criminal laws." And that the proposed Game Refuge Bill is a "police measure" that "reeks with the tyranny of petty officials."¹³

Difference of opinion, of course, is natural, inevitable, and desirable. Time and trial will work out the answer.

But however far economic demand may have pulled a scientific governmental agency into the realm of "police power," one interesting fact stands out clearly. The Survey to-day is just about as close to the great scientific organization which was responsible for its beginning as it was back in 1884, when the newly-organized American Ornithologists' Union had to appeal to the nation for aid when it was swamped by the response to its bird migration proposal. When the forty-fourth annual Congress of the Union was held at Ottawa in October, 1926, it was attended by no less

¹¹ The Survey, though strongly of the opinion that wild fowl are increasing under protection, is taking nothing for granted. A series of monthly wild fowl censuses was instituted in August, 1927, in order to secure continuing data of as dependable a nature as possible.

¹² See "Can We Save Our Game Birds?" A pamphlet of the National Association of Audubon Societies, and "Game, A Forest Asset—and Sometimes a Liability," by Will C. Barnes, in *The Forest Worker*, May, 1926, p. 20.

¹³ See files of the *Game Breeder*, the organ of The Game Conservation Society, Inc., an association formed in New York in 1912 for the purpose of game and fish breeding and various other related objects.

than eight major members of the staff of the Survey who are also members in good standing of the Union. Of these eight, one is the Union's secretary, another its treasurer, another a member of its council.¹⁴ Furthermore, a former biologist of the Survey, who is now an officer of the Smithsonian Institution, was elected to the presidency of the Union.¹⁵

This, no doubt, may be interpreted in various ways. It would seem to mean simply this: that the Survey started as a scientifically-minded governmental agency; that it is scientifically-minded to-day; and that vast economic functions with accompanying "police powers" have come to it not so much because of its own seeking, as because of national demand stimulated by the economic trend of the times.

Most significant of this fundamental scientific background is the last considerable public utterance of the Survey's Chief as of the time of this writing. Speaking to the Fourteenth National Game Conference, held in New York City under the auspices of the American Game Protective Association, on December 5, 1927, he said, in emphasizing the vital importance of scientific work in governmental wild life regulation:

Without a knowledge of the life histories and habits of our birds and animals, the administrator will be working largely in the dark. While splendid progress has been made in wild life research, there is much yet to be done.

¹⁴ The officers elected at the Ottawa Congress in 1926 were all re-elected at the Congress held in Washington in November, 1927. One of them, the secretary, was also elected second vice-president of the American Society of Mammalogists at the meeting of that organization in Philadelphia in April, 1927, at which time two other major members of the Survey's staff were elected corresponding secretary and editor. The American Society of Mammalogists was organized in Washington, April 3, 1919, by members of the staffs of the Biological Survey and the National Museum.

¹⁵ The Survey has been a notable training school for scientific workers. In addition to the Smithsonian officer mentioned, the following men were formerly on the Survey's staff: the Secretary of the Boston Society of Natural History; the Curator of Birds in the Pittsburgh Carnegie Museum; the Curator of Birds and Mammals in the Field Museum in Chicago; the Curator of Mammals in the University of Michigan; besides others that might be mentioned.

CHAPTER II

ACTIVITIES

The preceding chapter has narrated the development of the functions of the Biological Survey from its establishment to the present time. In this chapter an attempt will be made to give a somewhat detailed account of the present-day activities by means of which these functions are performed—that is to say the things the Survey actually does in its day's work here and now, in the carrying-out of the duties that legislation, reflecting the growth of economic influence has from time to time enjoined upon it. In doing this, consideration will be given to activities according to their nature. Those having to do with research will be dealt with first. There will then be taken up in order those having to do with the maintenance of wild life on the several reservations under the Survey's control, those having to do with the restraint of harmful forms of wild life, and, finally, those involving the enforcement of law and the furthering of conservational policies. All of them are wild life activities that, following the classification just outlined, may be simply described as wild life investigation, wild life encouragement, wild life discouragement, and wild life protection. Their relationship makes it inevitable that there should be, here and there, more or less of a merging or blending; particularly is this true of the second and the fourth of these simple distinctions: encouragement implies protection, and *vice-versa*. It is believed, however, that at no point will this occasionally unavoidable overlapping be sufficiently marked to produce confusion in the mind of the reader. The dividing lines will be kept as clear and distinct as possible everywhere; and when they tend to blur into no man's lands or twilight zones because of the likeness of hither to yon, effort will be made to distinguish, as nearly as may be, the leaving off of the one from the beginning of the other.

Wild Life Investigation. It is the theory of the Survey to-day just as it was when Dr. Merriam said a word to Congress on the

subject in 1908 that scientific activities, which is only another way of saying investigational ones, are fundamental to those upon which the bulk of the Survey's work and appropriations are expended. Witness the following from the most recent authoritative pronouncement, wherein it is stated, *inter alia*, that

The cause of the wild birds and mammals cannot be properly defended without a knowledge of their habits and life histories and of what States and other units are doing for their perpetuation. Intensive research, such as has been undertaken for more than four decades by the bureau, is fundamental to administration and should be continued by careful experimentation.

* * * *

Research studies will develop an effective administrative plan for each type of game or other species of bird or mammal, in building up impoverished stock to optimum numbers, in curbing undue increase and in controlling objectionable forms when this is necessary.

* * * *

The chief problem of the bureau is to obtain facts on which to base plans for wild-life administration. Until it has the necessary resources to gather these facts its work cannot progress to that point where it can be of maximum benefit to the birds and game and fur animals of the country, or of greatest assistance to the general public or to governmental agencies having jurisdiction over areas essential to the maintenance of wild life, or that are confronted with the problem of controlling excessive numbers of either harmful or beneficial forms.

* * * *

Without a knowledge of facts, there can be neither efficient administration nor intelligent regulation of wild life. The bureau desires exceedingly to meet its public obligations in wild-life administration. Its research activities are coördinated with a view to furthering the work of its whole organization. . . .¹

The studies broadly referred to as biological investigations constitute the basic studies of the Survey, and they provide the greater part of the fundamental scientific information necessary for the intelligent carrying out of its other activities. To begin with what is probably the most illuminating example of an activity upon which other activities depend, let us take the study of the life

¹ Biological Survey, Annual Report, 1927, pp. 2, 3.

habits of wild animals. As has already been made clear the preponderating bulk of the Survey's work, economically speaking, is the suppression and control of predatory and noxious animals, a work imperatively demanded by the agricultural and stock-raising interests of the country. To cope with these animals intelligently the Survey must know, so to speak, how they live, move, and have their being. So it sends its biologists out into the regions where they abound, to live with them and observe their ways. These men, by careful and painstaking observation, find out what the animals eat, where they live, how they make their nests or dens, and gather various other sorts of information about them. The sum total of the facts determined in this way about any particular animal, constitutes that animal's "number," to be filed away for future reference whenever its attacks upon the sources of the nation's food stuffs require the formulating of defensive measures. Sometimes these studies are made on the national forests or other government reservations; sometimes in farming, stock-raising, or orcharding regions. Sometimes they are made strictly "in the wild"; at other times animals are trapped and confined in different kinds of areas, or quadrats, for more intensive observation, and for experimentation with various kinds of foods.

Besides this work in the investigation of life habits, work is constantly carried on, both in Washington and in the field, in genus and species determination. Specimens sent in by correspondents are classified, and existing classifications are checked up and revised in the light of the most recently established knowledge.

Definite determination of where various animals and plants exist throughout the country goes on constantly. This work is done by means of direct observation in the field, by correspondence, and by keeping in touch with the research activities of other organizations and individual investigators. The information obtained by these methods is sifted, classified, and made readily available by card indexing.

Life zone investigations and the biological surveys of definite areas are likewise carried on. In this way much interesting and valuable information is obtained. An effort is made to determine, for example, why particular animals exist in particular places; the environmental elements, such as heat, cold, etc., that determine their

restrictions to their habitats. It is in connection with this phase of the work that some unusual and interesting observations are made of certain bird movements which carry birds up or down a mountain slope for change of conditions instead of north or south. This work is done both by direct field observation by the Survey's staff and by extensive correspondence.

Bird migration studies are still carried on as they have been since the Survey's beginning in 1886. Most of this work is done to-day, as in the past, through the medium of voluntary coöperators, or observers, throughout the country. About two hundred persons coöperate in this manner to-day, many of whom have so coöperated for many years, and a few since the beginning of governmental biological work. Their reports upon bird arrivals and departures and collateral phenomena, are digested, arranged, and filed away. There is thus in process of formation in the Survey's files a constantly growing collection of exact knowledge regarding the seasonal migrations of the birds of America.

It is through the medium of volunteer coöperators that the Survey is accumulating a great amount of invaluable avian information along two other lines: censuses of birds other than wild fowl and censuses of the wild fowl—ducks, geese, swans, etc.—that make up the great spring and autumn flights that have stirred the blood of sportsmen since time immemorial.

For about fifteen years now, censuses of the description first above-mentioned have been taken in various parts of the country, under the general direction, or, perhaps it would be more accurate to say, under the general encouragement, of the Survey, by a number of coöperators somewhat smaller than the numbers engaged in making the migration reports. The basic object is to get something like an adequate idea of the number of breeding birds of various species in typical localities. This is done by the counting of birds actually seen in a given area at the height of the breeding season, and by enumerating the male bird songs heard. An area such as a large field, or a marsh, or a piece of woodland, is selected, and careful records made year after year of the number and kinds of birds that nest therein. One method used in counting the birds in such an area is to have two census takers go over it dragging a rope between them to start the birds up. By comparing

the results from a number of such areas in different parts of the country and then multiplying the average struck, the Survey is enabled to arrive at a rough estimate of bird numbers. Of course the greater the number of coöperators the more nearly accurate will be the results arrived at; and the Survey is doing all that it can to encourage and develop this investigation² from which it is already receiving yearly a great deal of interesting and valuable data.

Occasional censuses of wild fowl have been taken by Survey officers on some of the principal concentration areas, in the fall and spring months, for several years. It was upon the results secured at these informal countings, fortified by reports received from sportsmen in various parts of the country, that the optimistic statements were given out regarding the results flowing from the federal protection of migratory birds. An example of all these Survey-made censuses is the one made of wild swans in December, 1925, on Chesapeake Bay, Maryland; Back Bay, Virginia; Currituck Sound, North Carolina; and adjacent waters. This was the first fairly complete census ever taken of the wild swans of Eastern North America. A total of 14,567 was counted, which meant, with a reasonable allowance for eluders, that swans in excess of fifteen thousand were in the region.

As was brought out in the latter part of the preceding chapter, however, there was considerable of a "dissenting voice" among naturalists with regard to the real accuracy of these early estimatings. In order, therefore, to do all that was possible to determine whether wild fowl were on the increase or decrease, the Survey set on foot, early in 1927, another coöperative census-taking project directed at wild fowl alone. Some twenty-five hundred sportsmen and conservationists were enrolled throughout the country as voluntary observers,³ and counts were made once a month, on days fixed by the Survey, at the principal wild fowl concentration areas, the results being forwarded to the Survey immediately afterward. A Survey officer was detailed to visit these areas and coach the observers. Printed instructions covering methods of observation

² See "The Purpose of Bird Censuses and How to Take Them," by May Thacher Cooke, Agric. Dept. Circular 261.

³ They are located in every state in the United States, in six Canadian provinces, and in Mexico.

were also widely distributed.* It is planned to keep up these monthly large-scale countings for several years, or until enough dependable information has been secured to determine, without fear of successful contradiction, whether wild fowl are, or are not, on the increase. There has been most cordial coöperation in this ambitious project from state game conservation authorities and sportsmen's clubs, who have obtained qualified volunteer observers, tendered the services of game wardens, and even, in some cases, assumed responsibility for the direction of the censuses on a state-wide scale. Various agencies of the government are also assisting in the work; notably the Forest Service, the National Park Service, the Lighthouse Service, the Coast Guard, the Bureau of Reclamation, the Extension Service, the Weather Bureau, and the Bureaus of Fisheries, Indian Affairs, and Education.

The taking-over of the work in bird-banding from a private organization in 1920 has been related hitherto. Since then the work has gone forward steadily and in constantly increasing volume, and a great amount of exact knowledge regarding bird movements has been accumulated. At the close of the fiscal year 1927, *i. e.*, on June 30 of that year, the names of 1296 persons were on the Survey's list of bird-banding coöperators. No one may engage in the work without a permit from the Survey, which furnishes the aluminum bands to persons desiring them and gives instructions regarding the trapping and banding of the birds, the affixing of the bands, and the transmission of reports. During the year mentioned less than two hundred of these coöperators failed to make some form of report. At the present time there are well over a thousand active coöperators located over the entire North American Continent north of the Rio Grande, from Maine to California, and from Florida to the Yukon Territory and Alaska. The banding records of 91,848 birds were reported to the Survey between June 30, 1926, and June 30, 1927, an increase of more than twenty-two thousand over the number reported in the preceding year. Return records—*i. e.*, reports of bands taken from killed or captured birds—to the number of 4445 were reported during the same period. The grand total of birds banded since 1920 is now close to three hundred thousand.

* See Leaflet Bi-917, May, 1927. "Guide for Taking Censuses of Waterfowl."

Although most of this banding work is done by the coöperators, the actual work of the Survey consisting in the main of checking up on reports and indexing, a little actual banding is done by Survey officers when the opportunity offers. A Survey officer made a trip to the Old Crow River in Alaska in 1926 for the purpose of banding migratory wild fowl. The warden of the National Bison Range in Western Montana trapped and banded fourteen hundred ducks in the fall of 1927, and, for the purpose of acquainting the public with the significance of the work, released a number of them at various local and county fairs in the region in which the Range is located. This proceeding aroused great interest, and undoubtedly will bear results in the prosecution of the work in the future. Quite recently Survey officers stationed in Washington invaded one of the local starling roosts and banded a large number of these much discussed birds.

Already this banding work has been the means of conclusively demonstrating various facts regarding the distances and directions of bird flights of most unusual interest. Space does not permit a lengthy citation of such extraordinary instances. Probably the outstanding one is the case of the sea swallow that was banded in Labrador in July, 1927, and was picked up on the shores of the Bay of Biscay in the following October. Some years earlier a tern banded in Maine was found at the mouth of the Niger. A blue-winged teal banded in Nebraska in April, 1927, was shot in northern South America seven months later.

There is cordial coöperation in the bird-banding work with the game authorities of Mexico and Canada.⁵

Investigations of big game conditions along the same general lines already detailed with regard to predatory and noxious animals are also carried out from time to time. An account of an outstanding piece of work of that description now being carried on will here be given.

Reference was made in the preceding chapter to a commission appointed by the President's Committee on Outdoor Recreation in connection with the Jackson Hole elk. As this commission's

⁵For detailed figures on the results of the work in bird-banding, see "Returns from Banded Birds, 1920-1923," Dept. Bull. No. 1668, and "Returns from Banded Birds, 1923-1926," Tech. Bull. No. 32.

naming and functioning created the ground-work for one of the most important research projects which the Survey has in hand to-day, a word regarding the wherefore of its creation will make for a more thorough understanding of the phase of activity it set in motion.

After the government decided to embark upon a permanent policy with regard to these elk herds in 1912, winter feeding was carried out annually on the refuge that was established by the legislation adopted in that year, and later enlarged as recorded elsewhere. Practically nothing in the nature of a scientific study of these animals and the various factors affecting their numerical fluctuations, however, was ever made. Some censuses were taken,⁶ it is true, and some occasional examinations and reports upon conditions were made; but nothing of a sustained and continuing description was undertaken.

It becoming apparent, however, with the passage of the years that mere protection and winter feeding were not solving the problem, that the conditions causing recurrent periods of starvation continued to exist, and that inflexible statutes, unchangeable except at stated biennial periods, were preventing rational safeguard and control, the need for the ascertainment of a body of dependable facts to be used as a basis for future action became manifest. It thus came about that when the National Conference on Outdoor Recreation late in 1926,⁷ requested the President's Committee on Outdoor Recreation to appoint a special commission to consider the Jackson Hole elk problem, one of the resolutions adopted by that commission, during its meeting in Washington early in 1927, called for the undertaking, as soon as practicable, "by the United States Biological Survey in coöperation with other federal, state, and unofficial interested agencies of a comprehensive investigation of the history of the Jackson Hole elk and the factors affecting their maintenance in suitable numbers."⁷

⁶ By the Forest Service, in 1912 and 1916; by the Survey in coöperation with Wyoming in 1921, 1925, and 1927.

⁷ A resolution was also adopted by the American National Live Stock Association at its Salt Lake City Convention in January, 1927, calling for a general investigation of "the feeding habits of deer, elk and other large game animals and their relation to live stock grazing" in order to establish "a properly balanced program of game protection which will adequately protect live stock grazing interests on public and private lands."

As a result of this demand an associate biologist of the Survey was detailed to undertake the desired investigation at Jackson Hole, and the work had got well under way by the following summer. This investigation is still proceeding, and is the only large scale big game investigation being conducted by the Survey at present. Because of its outstanding importance, indeed, it may be said that the Survey is concentrating its big game research activities upon it. It comprehends, among other things, the working out of grazing problems, including the kinds of food plants consumed, the effects of overgrazing, the relation of elk movements to available feed, the relation of their feeding habits to grazing of livestock, and other features essential as a basis for the maintenance of adequate feed for the elk and the maximum use of ranges for livestock production. Diseases and parasites are also being studied, as well as local conditions affecting the health of the elk and livestock. The Forest Service, the National Park Service, the Bureau of Animal Industry, the Wyoming Game and Fish Commission, the local stock interests of the Jackson Hole region, the Dude Ranchers' Association, and interested sportsmen's organizations are coöperating.

Apart from their permanency the investigation the Survey is carrying on in Alaska for the improvement of the reindeer, both at the Reindeer Experiment Station at Fairbanks and out on the tundra ranges where the herds graze, may be compared rather closely to the wild animal and big game studies. In a general sense the same things are studied in the same way. The Survey experts live among the reindeer and study on the ground and at first hand, so to speak, the food of the animals, their management and handling both individually and in herds, the injuries to which they are especially liable, the diseases that afflict them, the parasites that infest them, and their conditions in general.

The nature of the reindeer ranges is also studied, as regards their types, *i. e.*, wooded or open, moist or dry, etc., and as regards location with reference to transportation facilities, etc.

Studies are also made of the influence of climate upon reindeer grazing, of soil conditions with reference to forage quality, of the various types of plants, lichens, and browses constituting the forage cover, and of range carrying capacity and range control and

regulation. In the forage cover studies the quadrat method has been utilized to some extent.⁸

In addition to the more ordinary activities which have just been outlined, investigations are made of reports which come to the Survey from time to time concerning previously unknown or unusual wild life manifestations, or known and normal ones reported as having attained unusual proportions, when justified by agricultural, horticultural, stock raising, forestal, or recreational need. Thus, quite recently, the field naturalist of the Puyallup, Washington, station was called upon to look into reports that bat colonies were consuming codling moths⁹ in the Washington apple orchards in abnormal quantities.

There is considerable coöperation with outside scientific agencies in connection with the Survey's biological investigations. Very recently an ecologist of the Carnegie Institution of Washington discussed plans with the Survey for developing and carrying forward research upon grazing and forestry problems now being conducted in the Southwest in coöperation with the Survey and the Forest Service. About the same time several members of the staff of the National Research Council conferred with the Survey in the interest of arranging comprehensive coöperative studies of geological, zoological, and botanical problems in the Aleutian Islands. It is planned to enlist in this work, in addition to the National Research Council, the Bureau of Plant Industry, the Forest Service, the Geological Survey, the Coast and Geodetic Survey, the Bureau of Fisheries, and the Smithsonian Institution. The Survey is interested in the undertaking not only because of its scientific value, but also because of the aid that would accrue in the administration of the Aleutian Islands Bird Reservation.

An important part of the work in biological investigations consists of the building up and the maintenance of the Survey collection of bird and mammal specimens which are housed in the National Museum. These collections have grown up principally

⁸ A study of the wild caribou of Alaska, lasting three and one-half years, was completed something over a year ago by the same scientist who is now studying the Jackson Hole elk. One of the main objects of the caribou study had to do with the crossing of the caribou and reindeer.

⁹ The pest, it will be recalled, to combat which it was proposed to import the kohlmeise and blaumeise in 1898, *Cf. supra*, p. 67.

from specimens taken in the field by the Survey's own investigators and hunters, though they include also some contributions from private individuals and from other institutions and museums, and some exchanges. It is remarkably complete and rich in variations, and is of great value to students and to biological research workers, who make extensive use of it. It includes well over sixty thousand specimens of birds and about one hundred and thirty thousand specimens of mammals.¹⁰ It does not include animals collected outside of North or Central America, or alcoholic specimens. All such specimens which have come into the Survey's possession have been transferred to the general collections of the National Museum, which are entirely separate and apart from the Survey collections. Many bird specimens over and above the sixty thousand total referred to, have also been transferred to the Museum collections.

The first, and probably the most outstanding example, of wild life investigation, apart from the purely biological studies, is that which has to do with the definite ascertainment, in the laboratory, of the food of birds, mammals, reptiles, and amphibians; another bit of work which, it will be recalled, has been carried on from the very beginning of the Survey's existence.¹¹

In a recent year, the calendar year 1926, examinations were made of the stomach contents of seventeen hundred birds of one hundred species. Bird pellets were also examined to the number of 1197. In the same year the stomach contents of eighty-six mammals, 176 reptiles, and ninety-four amphibians were examined. From the beginning of this work up to the present time, ninety-five thousand bird stomachs have been examined, and the stomachs of fifteen hundred mammals, and thirty-five hundred reptiles and amphibians.

About half the bird stomachs examined in the year just cited were of blackbirds from Louisiana, a circumstance that gives a hint as to the underlying economic force that lies back of this work. Blackbirds received such disproportionate attention in 1926 because they had been particularly destructive in Louisiana, and had thus drawn attention upon themselves. The Survey had investigated the outbreak on the ground and had collected many

¹⁰ The largest one-continent mammal collection in the world.

¹¹ That is to say, so far as birds are concerned. The examination of the stomach contents of mammals, reptiles and amphibians began later.

specimens for laboratory study. Many were also sent in by private parties. Outbreaks of other birds in other parts of the country in other years have invariably resulted in increased work by the Survey in stomach contents studies of the birds guilty of the pernicious activities.

The determination of stomach contents is work that is necessarily elaborately exact, in some of its phases almost as much so as watch repairing. The greatest care is taken to identify and segregate the various food elements, and much of it has to be done with the aid of the microscope. It calls constantly for a wide knowledge not only of birds, but of plants, seeds, grasses, grains, fruits, and insects as well—to say nothing of many other things. When the examination has been concluded the material examined is filed away in a jar of preserving fluid and carefully labelled. The data secured is likewise filed away on an index card—the food and other elements discovered, the species and type of bird (*i. e.*, whether nestling or grown) when and where the bird was taken, and any collateral information of importance. Cards are also made of the several food elements—insects, grains, grasses, etc., so that information may be readily procured when desired regarding what foods are largely eaten by what birds. Summations are frequently made and averages struck. The value of this great and constantly growing mass of information in working out methods for controlling injurious birds is a thing that speaks for itself.

Naturally the matter of bird control suggests the one bird that has been damned more than all other birds combined from before the day of its denunciation by Dr. Merriam as a “virulent curse meriting systematic attack and destruction” down to the present time. The English sparrow is still viewed with more distrust and hostility than any other bird in America, native or imported, and it cannot be said that any considerable sentiment exists looking to its encouragement and additional increase. By and large, it is still an avian undesirable citizen. Fairness and exactness, however, demand the making plain at this time that a certain mellowing of the old attitude of uncompromising hostility has come to pass. Experience seems to have demonstrated that notwithstanding all its faults, the English sparrow has its points. That the Survey to-day regards it as a somewhat less virulent curse than did Dr. Merriam,

would seem to be made plain by the following official utterance of recent date:

Because of its tendency to gather in large flocks and congregate in the vicinity of chicken yards, warehouses, experimental plots of grain, and even along the borders of more extensive fields of grain, the English sparrow must be looked upon as a nuisance locally. There may be areas embracing several counties in which the bird at times is so abundant in rural sections that a general reduction in its numbers is advisable. Ordinarily, however, control work confined to the local communities where the birds have proved most troublesome, and in which resident farmers coöperate, will remedy the situation. In the Eastern States the problem of the English sparrow is decidedly a local one, and there is evidence that the bird has decreased in numbers in that area in the past decade. It is not looked upon as the outstanding menace to native birds as it formerly was, although it is still necessary to hold it in check where other hole-nesting species are being fostered. Nestling English sparrows are insectivorous to a marked degree and when abundant exert a controlling influence on certain pests. A case in point is their commendable work against the alfalfa weevil in Utah. The task of examining more than eight thousand stomachs of English sparrows upon which to base a modern appraisal of the bird has been completed in the Division of Food Habits Research.²²

The completion of the food habits investigation mentioned in the quotation just made brings to a close a really stupendous piece of laboratory work which has been in progress in the Survey intermittently over a period of nearly ten years; and it makes available for study a mass of material far greater than has ever before been used in an attempt to determine the economic status of a single species of bird. It means that literally and figuratively the Survey has put the English sparrow under the microscope in an effort to ascertain once and for all, just how bad and just how good this bird really is. Some idea may be gained of the relative scope of this investigation, and of other studies of bird food habits made by the Survey by bearing in mind that the material used in studying the English sparrow has been three times greater than that used by the Survey in the study of the starling, which held the record

²² From a memorandum issued by the Chief of the Biological Survey, October 26, 1927, to all field men regarding practices and policies in matters of bird control.

up to the completion of the English sparrow investigation, and that the starling material was greater in amount than the combined material used by all European investigators of this last-named bird.

A matter somewhat collateral to the laboratory studies of stomach contents is the investigation of the propagation of game birds, an industry which has attained considerable proportions.¹³ So far the work done by the Survey along this line has consisted principally of keeping in touch with the industry both in this country and Europe, and indexing the information thus secured. Considerable study and examination has been made in the field, however, and at the principal game farms throughout the country. In 1927 a representative of the Survey investigated methods of propagation of water fowl and other game birds in Europe, visiting several establishments in Holland, France, and England for that purpose.

Besides investigations of the work in game bird propagation, studies are made of the food, diseases, enemies, etc., of wild game birds from time to time.¹⁴ Surveys of the available food resources for migratory wild fowl are also made.¹⁵

The outstanding piece of work in game bird research at present being performed by the Survey consists of the quail investigations, which are going forward in northern Florida and southern Georgia, under the financing of a number of large estate owners in that locality. To this activity brief reference has been made in the preceding chapter.

This work has now been going on for something over three years. The headquarters of the investigation is at Beachton, Grady County, Georgia, where a laboratory has been established, but the two investigators—assistants of the Survey specially employed for the work—are pursuing their researches in every portion of the territory. Every conceivable detail touching the lives of these

¹³ Over 45,000 wild fowl were raised on game farms throughout the country in 1927 under federal permits. These figures include 39,695 Mallard ducks and 4651 Canada geese. The concentration upon Mallards is due to two reasons: They are much easier to raise in captivity than other wild ducks, and are in much demand by hunters for decoy use. The famous and expensive canvasback is very hard to raise in captivity.

¹⁴ For example, a field study was made in 1927 of the "duck sickness" afflicting waterfowl at some of the large concentration areas in the western states.

¹⁵ Such surveys have been completed in Missouri, Montana, North Dakota, Minnesota, and the upper peninsula of Michigan. They have also been made in scattered localities in other states.

interesting birds is being painstakingly studied, and the results obtained are being analyzed in order that, wherever possible, dependable plans and procedures for the future keeping of the covers may be evolved.

In general, the work being done includes studies of the food of the birds, studies of their habits, studies of their natural enemies, and studies of their environment with a view to making it as favorable as possible.

For the food studies examination is being made, partly at the study laboratory and partly in the Division of Food Habits Research in Washington, of as large a number of crops and gizzards as possible. For this purpose the stomachs of a considerable proportion of the birds killed during the shooting season on the covers of the estates included in the investigations are carefully preserved and turned over to the investigators. By making an intensive examination of this sort, covering a period of years, it is hoped that a clear understanding may be arrived at of the relative importance of the various sources from which the birds' food supply is drawn. Laboratory examination, coupled with direct field observation, is being employed to determine to what extent the food of the birds varies in different seasons of the year, both as regards availability and variations in preference by the birds themselves. Careful note is also being taken of the effect of the planting of various food grains by certain of the estate owners for the purpose of augmenting the natural food supplies of the birds.

The habits of the birds, both individually and in coveys, are being studied by means of direct observation in the field and by trapping and banding¹⁰ experiments. Nests are located and watched in order to determine such things as relative safety from enemies and hazards, preferences in locality, and nest-building materials. Individual and covey ranges are noted; as are covey organization, sex ratio, etc.

In the same elaborate manner investigations are going forward of the natural enemies of the quail and of the hazards inherent in meteorology and certain local practices of man. The study thus far has definitely established that there is a terrific destruction of eggs and young birds, and a not inconsiderable drain upon adult birds by certain predatory and noxious animals, including the cur

¹⁰ Up to 1927, a total of 2100 quail had been banded by the investigators.

dog, and the pussy cat so undeservedly praised in Mother Goose. Various snakes also exact a rather melancholy toll. Destruction by avian enemies, such as hawks, owls, crows, and shrikes also undoubtedly occurs, but its seriousness so far seems to be open to considerable question, except, possibly, in the case of the crow. The marsh hawk, for example, undoubtedly preys upon quail; but it preys to an enormously greater extent upon the cotton rat, one of the most destructive mammal enemies of the quail that exists.

It has also been established that uncontrolled general woods burning, a practice which has been prevalent in the South from the earliest times, and which seems to die very hard, is indirectly responsible for quail mortality by destroying cover and thus forcing the quail to nest in exposed locations.

Comment similar to that already made applies to quail parasites and diseases, which are being looked into in the same thorough-going style.

Out of this large-scale essay in exact determination, it is confidently believed that there will flow numerous interesting results of the greatest value in the practical conservation of this splendid game bird; results that will be utilizable not merely in the region where the investigation is being made, but throughout the country at large. For the opportunity to make this most complete study that has ever been made of an American game bird, not only the Survey but all bird lovers and sportsmen are under great obligations to the citizens whose liberality has made it possible.

Ever since the beginning of the fox-farming industry, the greatest obstacle in the way of its successful progress has been disease. Distempers of various sorts have caused great losses, which recently have run as high as ten thousand animals per year. This has naturally resulted in a growing volume of demand from the industry for expert advice and assistance, based upon adequate research, in the fight against this formidable wastage.

Until recently the work done by the Survey in response to this demand consisted in the main of observations made at the fur experiment station at Saratoga in New York State by the regular staff there,¹⁷ coupled with such studies at private fox ranches as

¹⁷ See "Critical Tests of Tetrachlorethylene as an Anthelmintic for Foxes," by Karl B. Hanson, director of the farm, *Journal of Agricultural Research*, XXXIV, No. 2, pp. 97-195.

could be made from time to time by the personnel of the Division of Fur Resources incidental to its general duties. There was no one, in other words, charged with fox disease research to the exclusion of all other work.

Representations as to the seriousness of the disease situation made by the fox farming industry, however, constrained Congress to allot increased funds to the Survey's work on the contagious diseases of fur animals, beginning July 1, 1927. This permitted considerable expansion of the work already being done, and, what was more important, made possible the appointment of two experts, one of them a veterinarian formerly in the employ of the Bureau of Animal Industry, to devote their entire time to the study of fox diseases and to the assistance of ranchers in the solution of the health and sanitation problems arising in their calling. Work was begun under the enlarged plan in August, 1927.

It is not possible for the Survey, even under this amplification, however, to give personal attention to every appeal for advice. Where it can be done, representatives of the Survey do go to the ranches where outbreaks of disease occur, and advise on control methods. Where that is not possible by reason of the ranch's inaccessibility or the press of other work, the matter is handled by correspondence.

In addition to cooperating in every possible way with the individual ranchers, the Survey's experts collect material for laboratory study, and conduct research work looking toward the determination of the causative agents of the contagious diseases, in order that preventive measures may be instituted; it having been definitely determined that curative treatment is much less successful with foxes than with most domestic animals. In this study of contagious diseases the Survey is cooperating with the medical school of the University of Minnesota, some members of the faculty of which have done some important work in recent years in the study of encephalitis and paratyphoid among foxes.

Under cooperative agreement recently entered into between the Survey and the Governor of Alaska, a veterinarian selected for the work by the Survey is making a study at first hand of fur-bearing animal production in the northern territory in order to secure data from which dependable advice may be formulated in matters pertaining to the breeding and care of fur-bearing animals

and the prevention and cure of diseases among them. Direct co-operation will be had in the study with the Alaska Game Commission, the Forest Service, fur farmers' organizations, and other agencies. The sum of \$15,000 has been appropriated by the territorial government for expenditure in the project in 1927 and 1928, in addition to such sums as may be allotted by the Survey from its regular appropriations.

General interest in the raising of rabbits for meat and fur has grown during the past few years, very appropriately, by leaps and bounds. The growth, indeed, is far outstripping the Belgian hare furore of 1900 and rivalling the initial excitement stirred up by fox farming. Early in 1927 the Survey received upwards of twelve hundred inquiries about rabbit-growing in a period of four days. The publication of an article on the subject in Sunday newspaper magazine supplements a few months later brought about the practical snowing under of the Survey by an enormous number of requests for information from all over the country, necessitating the immediate ordering of special reprints of the existing rabbit publications.

The Survey's reaction to this remarkable development has already been referred to in a general way—the initial investigations at the Saratoga fur experiment station and at the centers of the rabbit industry; the appointment of a special assistant to devote his entire time to rabbit research; and, finally, the establishment in the present year of a new experiment station devoted exclusively to the investigation of all phases of this new line of human industry.

The new rabbit experiment station at Fontana, San Bernardino County, California, consists of five acres of land situated in the great Los Angeles-San Diego rabbit raising district. On it there have been erected an administration building, a caretaker's house, a feed storage shed, hutches, and other buildings to care for a large number of breeding rabbits. The land, buildings, and other equipment have been furnished by the local unit of the National Rabbit Federation and the Fontana Farms Company. The Survey, under a coöperative agreement entered into with these two organizations, finances the operation of the station, and plans and conducts the experimental work done there for the improvement of the rabbit-raising industry throughout the country. The purpose of this work is to develop reliable information for rabbit breeders

and for those contemplating raising rabbits as to the best methods of breeding, feeding, and housing for the production of meat and fur of high quality. In the conducting of the experiment at the station, coöperation is sought with all local and national organizations interested in the industry.

Apart from the work at the station the Survey is coöperating with the National Rabbit Federation in general extension¹⁸ and experimental work, and with the Rabbit Breeders' Exchange in the grading and sale of rabbit skins in order that producers may obtain the best market prices. Coöperative investigational work is also being carried on between the Survey and the Bureau of Chemistry and Soils of the Department of Agriculture to ascertain the value of rabbit manure and offal as sources of fertilizers and various commercial oils.

The extension of the Survey's rabbit work outlined above was made possible by an increase of \$15,000 in the appropriation for the economic studies of birds and animals during the fiscal year 1928; which was allowed by the House Committee on Appropriations after representatives of the rabbit breeding and fox farming industries had appeared before it and furnished information showing the need for greater emphasis upon research for the combating of diseases affecting their stock.

At the Eradication Methods Laboratory, which is maintained in Denver, Colorado, in connection with the highly economic work of predatory and noxious animal control, considerable investigational work is done in the way of developing effective poisons for combating these pests. Experiments have been conducted from time to time in conjunction with the Bureau of Chemistry with a view to developing more efficient wild animal poisons. Recently these tests resulted in the production—from dried red squill bulbs—of a poison for rats which has an efficient and uniform toxicity for those animals and at the same time does not apparently endanger human beings or domestic animals.

Wild Life Encouragement. As has been mentioned hitherto the Survey has not found it necessary to make any attempt to introduce foreign game birds under the authorization contained in Section 1 of the Lacey Act, by reason of the fact that this work has been

¹⁸ As to a specific instance of which, see Appendix 3.

done rather extensively by private enterprise.¹⁹ Introductions of this sort at private expense have enabled the Survey to devote its attention to other matters than the buying and distribution of birds, and have furnished it with abundant opportunity for the study and investigation of the subject of game bird introduction in many parts of the country.

Most of the importations have been made by state game commissions and by sportsmen, sometimes individually, but generally in associations—gun clubs, etc. By far the greater part of the birds imported have been of the more commonly known species, such as pheasants, quail, and partridges, but many rarer birds, such as the capercaillie and black game of Europe have also been brought in. In the season which ended on April 30, 1927, more than eighty-five thousand quail were imported from Mexico, the greatest number ever imported into the United States in one season.

The most recent example of the importation of rarer or more exotic species of game birds has already been referred to in what has been said above regarding the attempt being made to establish some game birds from Central America on some of the "sea islands" off our southeastern coast. This attempt constitutes the most noteworthy bit of work being done by the Survey at present in the matter of game bird introduction study. The experiment is a coöperation between Mr. H. E. Coffin, the owner of Sapelo Island, Georgia, and the Survey. Mr. Coffin is furnishing the funds for the work and the locale for the same. The Survey made arrangements for securing the birds, and is observing their progress carefully in their new environment.

In short, it may be said, in connection with this matter of game bird propagation, that the Survey, although not engaging in the work directly, is encouraging it wherever possible.

With respect to birds other than game birds—song birds, insectivorous birds, etc.—the Survey devises methods and gives advice upon request as to how to attract them to parks, the vicinity of homes, etc. It also gives advice regarding the production of small animals, such as rabbits and guinea pigs, for pets and for laboratory use.

¹⁹ It is but fair to state, however, that appropriations have not yet permitted the Survey to do work of this sort on its own.

The Survey's principal work in wild life encouragement is done in connection with its maintenance of the big game preserves and the bird refuges. Game and birds are protected on these refuges to the extent of the Survey's resources, and efforts are made to encourage their increase. In the case of the big game animals these efforts aim at the production of herds of a size capable of being supported by the existing forage, but no larger. In order to insure that there will be sufficient food for the animals retained on the big game reservations surplus animals are disposed of in various ways. As no hunting is allowed on the big game preserves this disposal is accomplished mainly by the sale of animals for stocking or exhibition purposes. An example of this was the removal of 221 buffaloes from the Bison Range in the winter of 1924-25. The shipment of 338 surplus elk from the same reservation to purchasers in Massachusetts has already been referred to.

The overstocking of well located refuges that are not too large may usually be prevented by regulated hunting outside. On larger preserves, or on those from which there is little or no overflow, hunting or reducing the surplus by other means may be of vital importance to the residue. Sometimes, by transfer of surplus animals, the needs of another locality may be met. Thus, three elk were recently shipped from Wind Cave Preserve to the experiment sub-station of the Nebraska College of Agriculture at North Platte. Lately, also, three buffaloes were shipped from the Montana Bison Range to the Zoological Gardens at Rome, Italy, a gift from the United States.

Even when there is not a surplus, animals can sometimes be spared for restocking purposes elsewhere. An example is the recent transportation of six elk calves from the State of Washington to Kruzof Island, Alaska, where they were liberated. This was under the territorial stocking program of the 1927 legislature, carried out by the Alaska Game Commission. A contract has been signed for delivery next spring of six mountain goats to be shipped to the State of Washington in return for the elk, and for additional elk for the Kodiak-Afognak group of islands.

In addition to the actual protection of the animals and birds on the refuges through the administration of the act of April 15, 1924 (43 Stat. L., 98), protecting wild life and public property on reservations, and the Upper Mississippi Wild Life and Fish Refuge

Act of June 7, 1924 (43 Stat. L., 650), the Survey also performs an activity in special connection with the Jackson Hole Elk Refuge that should not go unmentioned. There in addition to the maintenance work similar to that performed on the other refuges—fencing and building upkeep—it plants each year a considerable area to hay, which is harvested, stored, and fed to the elk in the winter feeding season.

The regulation and encouragement of fur farming on the Alaska islands under its jurisdiction is another activity of the Survey coming under the general category of wild life encouragement. No fur farming may be engaged in on the Alaska islands under its control without a permit from the Survey.

The activity mentioned heretofore having to do with the encouragement of sheep grazing on some of the Alaska islands under its control is purely a relative or subsidiary activity that the Survey has been obliged to undertake by reason of the situation produced by the existing jurisdictional arrangement. It is simply a matter of the leasing of a publicly owned resource by a governmental agency which happens to be in charge of that resource, because it is an inseparable part of a larger whole which the said agency necessarily controls. It is no attempt at crowding over by the Survey into the domain of animal husbandry; no more so than is the leasing by the Forest Service and the Indian Office of grazing privileges on the national forests and the Indian reservations.

Mention was made in the preceding chapter of a proposal to improve the wild fowl situation in the West by flooding the Bear River marshes on Great Salt Lake. This proposal is part of a plan which has been considered for some time by the Survey and various associations of Western sportsmen looking to a restoration of the conditions formerly existing at three of the greatest points of wild fowl concentration in the West—to the extent that such a restoration may be possible. These three centers are the Bear River delta in Utah, Lower Klamath Lake in northern California, and Malheur Lake in eastern Oregon. For the purpose of enabling preliminary studies of these projects to be made under the direction of the Survey, a fund was raised within the past year by Western sportsmen; and in August, 1927, preliminary investigations were made by Survey officers, in coöperation with engineers of the Bureau of Public Roads, of the practicability and cost of con-

structing dikes and other control works necessary to provide adequate refuges for waterfowl at these historic resting and feeding grounds of the spring and autumn migrations between Alaska and the tropics. Deplorable conditions have come to exist at all of them; partly because of the activities of man in connection with reclamation works, partly because of a long succession of years of scanty rainfall throughout the regions in which these concentration areas are located.

One of the results of this reconnaissance has been—quite recently—the definite abandonment of the Klamath Lake project because of obstacles precluding its further consideration, and the concentration of effort, for the present at least, upon the Bear River area. It was found that the cost of restoring the *status quo ante* reclamation at Klamath would be very great; and that certain practical considerations, such as agricultural opposition in the immediate vicinity and stipulations in Oregon and California laws providing that the water needed in the restoration scheme should be used for irrigation, made further effort futile.

Mention has already been made of the enactment of the legislation authorizing the creation of the Bear River Refuge. The second deficiency act of May 29, 1928 (45 Stat. L., 883, 895), appropriated \$200,000 of the total authorized amount of \$350,000, and plans are being made for the active commencement of the work. The project will include the acquisition of approximately twenty thousand acres of land and the diking and ditching of marsh and water areas for the establishment of a refuge of approximately forty-five thousand acres.

The Klamath case is more than ordinarily interesting because it was referred to by the Chief of the Survey some three years ago as a striking example of foolish reclamation undertaken without previous ascertainment of the results that it would produce.²⁰ It is interesting, also, because of the agitation for the restoration of the old conditions there which has been made by conservational organizations, and particularly by the National Association of Audubon Societies, for many years.

²⁰ *Official Record*, October 22, 1924.

The present situation at Klamath was brought about by closing the inlet connecting Lower Klamath Lake and Klamath River.²¹ With the supply of water cut off, evaporation in a few years dried up the lake, and the adjoining marshes, once an ideal resting and feeding ground for wild fowl, became in the main, impossible for that purpose.²²

The final instance that will be given of the work of the Survey that has to do with wild life encouragement is in connection with wild fur-bearing animals. In every way possible, but principally by coöperation with the national association of the fur industry, it endeavors to spread throughout the country a knowledge of the best practice in trapping from the standpoint of greatest individual benefit in the long run. It aims to educate the farmer and the trapper away from the old heedless methods of pioneer days to a realization that over-trapping and a taking of unprime fur is a killing of the goose with the golden egg. The results it is achieving in this effort though not spectacular are steady.

Wild Life Discouragement. In another connection reference has been made to the working out of methods by the Survey for the control of injurious birds, based upon the information obtained in its investigative work. These methods are worked out to some extent continuously, as knowledge of their habits becomes more certain with resulting clearer understanding of the best ways in which to work against them; principally, however, they are evolved in response to extraordinary depredations. They vary somewhat, depending upon whether the bird to be repressed is, or is not, protected by the terms of the Migratory Bird Treaty Act. If it is not, the procedure to be followed is comparatively simple and is regarded as more or less a local concern. If it is protected by this act, however, permission must first be obtained to proceed against it under Regulation 10 of the act mentioned.

Requests for permits of this sort are generally based, as might be expected, upon damage being done to agricultural interests; but

²¹ Done for the purpose of laying bare in the lake bed a large area of tillable land. This expectation is said not to have panned out as anticipated—the final result being a vast alkali flat without either tillability or wild fowl.

²² The Klamath situation has been somewhat improved by the recent establishment, by executive order of April 3, 1928, of a new bird refuge consisting of some five thousand acres of marshlands around the head of Upper Klamath Lake.

occasional exceptions arise, sometimes not lacking in piquancy. Thus, an appeal for permission to wage a holy war upon woodpeckers came not long ago from a Methodist congregation in upstate New York, which had become concerned at the assaults that numbers of these birds were making upon the roof and steeple of their church.

Bird attacks upon fields and orchards have occurred at various times in all parts of the country involving practically every kind of crop and every kind of bird. There was a robin outbreak some years ago in New England; another in California; more recently one of blackbirds in the Imperial Valley. But what is unquestionably the best known avian complication of the sort, because the one longest continued and most in the general public eye, is the one having to do with the bobolink, or rice bird, depredations in the rice fields of the southeastern coastal region. The reader will recall that this matter was brought very prominently to the Survey's attention in its earliest years, when it was still the Division of Economic Ornithology and Mammalogy. From that day to this, rice birds have constituted an annual annoyance of the rice planters that the Survey, in the nature of things, has had passed on to it for advice. One of the first permits to kill migratory birds under Regulation 10 was for the killing of these birds from Pennsylvania south to Florida for the protection of the rice growers. Early in 1927 this permission was revoked by the Secretary and a new authorization promulgated on more restricted lines, the real gist of which is the placing of responsibility for bobolink control in the hands of the wild life authorities of the rice-growing states. Under this authorization only persons owning or leasing lands in the Carolinas, Georgia, and Florida on which rice is actually being grown, together with members of their immediate families and their *bona-fide* employees, may shoot bobolinks; and then only when authorized to do so by a special permit of the Secretary of Agriculture, countersigned by the officer in charge of the fish and game laws of the state in which the permit is effective. Furthermore, shooting may be done only between the inclusive dates August 16 and November 15, and only on rice fields where the birds are seriously injuring the crops.

In discussing, in the previous chapter, the influences that combined to bring about the adoption by America of the principle

of the restriction of the importation of birds and animals, mention was made of the fact that the habits of a wild creature are liable to change completely in a new environment; that which was harmless on its native heath very possibly becoming violently destructive when set down overseas. A striking illustration of this is the corn borer, at present one of the outstanding agricultural menaces of America. In Europe, whence it was imported in cargoes of broom corn in 1909-10, the corn borer was a decidedly minor pest, so minor, indeed, that little attention was paid to it, and very scant mention of it was to be found in European literature.

A phase of injurious bird control, and a most important one, is also part of the work called for under the importation provisions of the Lacey Act. Certain birds, as has heretofore been explained are arbitrarily excluded. If there is no doubt as to their excludability on the face of the request for their importation, entrance is denied them at once. If there is doubt about it, they are examined at the port of entry and either admitted or returned. This procedure, of course, applies to mammals as well as to birds.

From the standpoint of bulk, money expenditure, and present day economic importance, the biggest part of the Survey's wild life discouragement work has to do with the warfare against predatory and noxious animals, particularly in the western and central portions of the country.

Through its force of predatory animal leaders and hunters supplemented by coöperating forces of state-paid hunters the Survey constantly wages warfare against coyotes, wolves, mountain lions, bobcats, and, to, a slight extent, bears.²³ The leaders are established at strategically located headquarters throughout the Western country whence they direct the work of the hunters and keep in touch with the situation throughout the territories assigned to them. They intensify the work in areas from which they receive complaints of predatory animal outbreaks of any sort against stock by concentrating their hunting forces therein. A like procedure is followed immediately upon receipt of news of the occurrence of rabies.

Wolves and coyotes are combated by shooting, trapping, killing in the den in puphood, and poisoning. The last-mentioned method

²³ Bears are only killed when they take to stock stealing. The other animals mentioned are killed at all times.

has come to be considered the most certain, resultful, and economical. In the case of the wolf, whose numbers have never been so great as those of the coyote, shooting, trapping, and denning have worked well; and, under the hunter concentration methods worked out by the Survey, would probably of themselves suffice to keep the animal within bounds and, eventually, exterminate him. Poisoning has simply been a making doubly sure of assurance.

In the case of the coyote, however, experience has demonstrated that the extensive use of poison is not merely advisable but necessary. Altogether apart from the fact that this animal's extreme cunning enables it to keep out of rifle or trap-induced trouble many more times than it succumbs thereto, and that its adaptability enables it to make of the ordinary forms of organized and intensive pursuit a mere whetstone for the progressive sharpening of a craftiness already abnormally sharp, its sparrow-like prolificity gives it a command of the trap and rifle game than can scarcely be challenged, much less menaced. Simply the coyotes breed faster than the hunters can shoot them or the trappers trap them. One-at-a-time elimination avails little against an animal that sometimes has fourteen pups to the litter.²⁴ Without poisoning *ad lib*, it has come to be recognized by those making a study of the matter, the predatory animal fight is hopeless so far as the inroads of the coyote are concerned. The use of poison has given man something like an even break with this little brother to the wolf—possibly a shade better than an even break. Sheep can now be run on parts of the Western ranges where their running was an economic impossibility before the coöperative poisoning work was instituted.

Better evidence of the efficacy of this work than the reaction of the stockmen thereto could hardly be desired. Nevertheless, a little will be given. As to the stockmen, they are everywhere enthusiastic for it and willing to contribute financially toward its furtherance in addition to rendering actual physical assistance in the field. The sheepmen of Idaho, for example, assessed themselves from two to five cents per sheep in 1925 and thus raised a fund of over \$30,000 for donation to the work when no coöperative appropriation was made by the Idaho legislature. The fund thus raised and donated was more than twice the sum allotted to the work in Idaho by the national government. Considering that the work was practically

²⁴ Such litters are exceptional. The average is around six or eight.

all on public lands it is hardly too much to construe the thought back of the action as fairly commendatory. And that this vote of stockman confidence is not merely local, or merely as regards the sheep industry, is evidenced by the fact that the American National Live Stock Association, at its conventions in 1924 and 1925, and in following years, passed resolutions cordially approving the work as carried on and urging its membership to work for state appropriations that would make possible full coöperation between the states, the private owners, and the nation as represented by the Biological Survey.

The better evidence referred to above is the evidence not of stockmen, but of ex-stockmen. The humor of it makes it not a whit the less pathetic. To the givers of that evidence it was as solemn as the Decalogue.

The givers of that evidence were some seventy men who had taken up stock-raising homesteads in Nevada under the 640-acre law²⁵ only to discover that under the best of circumstances such areas are not big enough for a successful stock business. On top of that, the ill-fortune that has fallen upon the cattle country in post-war years in the shape of drought and depression, came along and laid them flat. They found that to continue to stay on their holdings and live, considerable eking-out would be necessary. Anything, no matter how small, that would fetch in a dollar, became a thing of importance. Coyote pelts could be sold for from two to three dollars apiece. Therefore—

All of which will make it sufficiently clear why those seventy-odd stockmen of Elko County, Nevada, near the Humboldt National Forest, were constrained to address to the Biological Survey headquarters at Reno, on the 25th of August, 1925, the following petition:

We are advised that it is your intention to place poison baits for coyotes through the northern part of Elko County.

The depression of the last few years has made trappers out of many of us who depend upon the sale of coyote furs for a part of our livelihood, and we feel that at this time it would be as unjust to destroy this part of our income with poison as it would be to destroy our timber with fire.

²⁵ Act of December 29, 1916 (39 Stat. L., 862).

Therefore, we, the undersigned, do respectfully request that no poison be placed for coyotes in our section of Elko County by Government or State employees.²⁶

This conjunction of economic pressure and economic opportunity will likewise make plain why it was that, upon a somewhat earlier date, at a stockmen's meeting at Susanville, California, which was considering the raising of funds to be used in the poisoning campaign, a delegation of settlers from a hard-hit district declared that

any time you eliminate the coyote from that section you take our winter groceries, because they have given us the only source from which we can get them.²⁷

Hunger is occasionally something other than the best sauce. It is sometimes the best evidence. In the cases just cited it was pretty conclusive evidence that wholesale poisoning, organized and co-ordinated, was coming closer to solving the problem than had the trap and the rifle.

But let it not be understood that this last statement is tantamount to saying that the coyotes are being exterminated. Far from it. In spite of the fact that hundreds of thousands of them have been killed or poisoned since 1915, they are still pretty nearly, if not a little more than, holding their own. They have demonstrated that they possess an adaptability and a resourcefulness capable, apparently, of rising to any situation. In the old days before the buffalo and antelope went and the sheep and cattle came, they were confined practically entirely to the Great Plains region from Mexico to southern Canada. Now they are not only found everywhere throughout the Western mountains, but they have extended their range southward to Costa Rica, northward to Alaska and to the mouth of the Mackenzie River in Canada, westward to the Pacific Coast, and eastward as far as western New York.²⁸ The Assistant

²⁶ Senate Hearings pursuant to S. Res. 347, 69 Cong. 1 sess., p. 4119.

²⁷ It should be understood, however, that this extreme eastern extension of the coyote's range was man-induced. Some auto tourists some years ago obtained some coyote pups in the West and carried them back home to up-state New York, where they either escaped or were liberated. They have increased in a wild region of marsh and forest and have been something of a menace to farm poultry. But this is not to say that they could not have gotten that far east unassisted. Their extensive spreading out in recent years would indicate the contrary. Quite on their own, they have spread east of the Mississippi as far as Indiana and Illinois.

Chief of the Survey about summed up the situation when, in speaking of the coyote, in late 1924, he said:

The coyotes . . . have acquired the ability of taking care of themselves in spite of civilization. . . . We have been able . . . to reduce the damage so that where the damage to the livestock used to be serious it is now quite negligible. We have not, however, exterminated the coyotes, and it is doubtful if they can be exterminated.

Quite recently—September, 1927—another bit of evidence of the efficacy of poison, from a somewhat different angle, was supplied by Nevada, when a predatory animal hunter in that state established a record month's kill for his district. He accounted for 114 coyotes and twelve bobcats—all killed with poison.

Mountain lions and bobcats are principally trapped, excellent results having been obtained, as hitherto related, from traps scented with the oil of catnip. These animals are cunning enough, but do not possess such an extraordinarily developed trap-wary instinct as the wolf and coyote.²⁸

Considerable effort is made against the mountain lion, however, by the direct hunting method. The hunters track the lions with specially trained dogs, and stay on a trail once found till the quarry is treed. With good dogs it is usually possible to do this unless rain falls, in which case scent and trace are alike obliterated.

The maintaining of cordial relationships with interested economic groups is regarded as an important part of this work, and no opportunity is lost for its furtherance. The predatory animal is an even more intimate problem to the stockmen, for example, than to the Survey; and with the stockmen whenever opportunity offers, conferences are held regarding eradication methods, game conservation, and other activities of the Survey affecting their interests.

The work of a certain Survey representative during January, 1927, well illustrates this. In this month he attended and addressed four important stockmen's conventions: the Oregon Wool Growers' Association, at Pendleton, Oregon; the Idaho Wool Growers' Asso-

²⁸ Considerable wolf and coyote—and especially wolf—trapping is done, however, and the use of scent is likewise largely relied upon to get them to step in the right place. Instead of a vegetable scent, various animal scents are used, in the nice concocting of which the Survey hunters have developed great skill.

ciation, at Weiser, Idaho; the National Wool Growers' Association, at Butte, Montana; and the American National Livestock Association, at Salt Lake City, Utah. At this last-named convention, in speaking of the question of stock-grazing and game-grazing on the national forests and other government land, he declared that the Survey was not interested in a game conservation program that would interfere with grazing interests and the raising of livestock, and deplored the radical utterances of fool conservationists, with which he said the Survey did not agree. He further declared that no game conservation program that would stand up, and be right and just to all interested parties, could ever be formulated until the stockmen were brought into the councils to assist in working out the final plan.

Until recently the warfare upon predatory animals conducted by the Survey has been confined to the Continental United States. Now it has been definitely extended to Alaska²⁹ with the making, in the summer of 1927, of a coöperative agreement between the Survey and the Governor. Under the terms of this agreement a Survey representative formerly in charge of predatory work in California has been detailed to Alaska to develop and demonstrate methods for the control of all wild animals destructive to game and livestock, but particularly wolves and coyotes. Coöperation will be had with the Alaska Game Commission in the instruction of game wardens and others in the control methods developed, and with officers of the Forest Service and other organizations and individuals in a position to participate in checking depredations. The agreement entered into is in the main similar to the agreements now in effect for the same kind of work between the Survey and most of the Western states.

During the fiscal year 1927 there were killed by federal and state hunters, forty-seven gray wolves, 154 red wolves, 37,887 coyotes, 246 mountain lions, 3677 bobcats, forty-one lynxes, and 186 predatory bears. It is estimated that at least fifty thousand additional coyotes were killed by poison and not found. The skins of these animals killed by federal hunters were sold and the pro-

²⁹ The present arrangement, which is designed to be permanent, is the first predatory work done by the Survey beyond the Continental United States of other than a temporary nature. The Survey did a little wolf control work in Alaska between September, 1922, and February, 1923.

ceeds paid into the national treasury. Since the beginning of the work in 1915 over \$300,000 has accrued to the government from the sale of skins so taken.

The revenue derived from this source represents the Survey's principal item of fiscal intake, being substantially greater than the monies accruing from the sale of excess animals at the several big game refuges.

From all of which it will be seen that predatory animal control is one of the outstanding activities of the Survey, and is likely to remain so for a considerable time in the future; with one of the species warred against for an indefinite time in the future.

Noxious animal or rodent control work by the Survey differs from the predatory work principally in this—that it is a matter of instruction and demonstration on the Survey's part rather than one of active participation. Like the predatory work it is coöperative with the states and localities worked in. The government contributes so much and the state so much, and both agencies then work in coöperation under the direction of government rodent control work leaders. But in the rodent work the government employs no force of rodent killers corresponding to the predatory animal hunters.³⁰ It simply organizes a drive in some particular locality, demonstrates how the work should be carried on, and then supervises the work of the force of local men that the locality has got together for the purpose.

As an example of this work, a pocket gopher control demonstration given in Graham County, Arizona, during the summer of 1927, may be cited. The demonstration covered six farms with a total area of 558 acres. The local farm bureau, the county agricultural extension agent and the Survey coöperated. A rodent specialist of the Survey acted as instructor and furnished the traps used. The farmers of the area did the actual trapping. As a result of this demonstration a two-year program for clearing the entire district has now been planned that will involve financial assistance from local water companies and the county board of supervisors.

³⁰ In busy seasons, however, the normal field force of about thirty-seven regular employees is expanded to about 132 by the employment of temporary labor, mostly paid out of coöperative funds.

Occasionally the method used is trapping, as in the instance just cited. Other rodents are combated with gases. This method has proved most effective against the ground hog, or wood chuck, pest in the eastern parts of the country, the mammals being gassed in their burrows in the spring months when they are concentrated under ground, engaged in raising new families. Carbon disulphide and calcium cyanide are both used, and gasoline and the exhaust gasses from gas engines are sometimes employed on small areas.

The bulk of the noxious work, however, against such rodents as the prairie dog, the gopher, and the jack rabbit in the parts of the West where the greater part of the work is done, is done by means of the spreading of poisoned grain of various kinds, processed at the Survey's Denver laboratory, and supplied to the communities engaged in the work at cost. Sometimes the grain used is wheat, sometimes oats. Recently twenty thousand pounds of steam-rolled oat baits were furnished at cost to three counties in the State of Washington combating a plague of orchard mice. Poisoned alfalfa leaves have been used against jack rabbits with excellent effect. Poisoned wheat is used against prairie dogs, and, as one result of its use that may be cited, prairie dog towns, once common in western South Dakota are gradually disappearing. The county agents in this territory have been active in introducing and demonstrating the use of the poisoned grain.

Some criticism has been directed at the Survey field men and their various coöperators for the distribution of this poison in rodent control work; many sportsmen and others interested in game birds maintaining that it is as fatal to feather as to fur. A series of tests which the Survey has conducted for several years, however, would seem to indicate that there is little basis for this belief. Areas in which gallinaceous game birds are numerous have been heavily treated with the poisoned grain, with disastrous results to the rodent life, but with no apparent effect upon the bird life.²¹

The work in noxious animal control as applied to the jack rabbit furnishes an interesting example of the manner in which various activities of the Survey are sometimes made to perform double or even more extensive duty. The primary object of noxious animal control is, of course, the keeping within bounds of animals

²¹ See "Effect of Rodent Poisons on Game Birds." (Bi-925; 7-27) Mimeographed.

inimical to agriculture and stock raising. But recently, through Survey effort, the combating of the black-tailed jack rabbit in Idaho and several other Western states has been given a reach going beyond the basic purpose—that is to say, the augmentation of individual incomes. Two fur companies have been induced to establish and maintain offices in southern Idaho for the purchase of pelts of this type of pest for felting purposes. These companies are paying from six to seven cents apiece for the skins, and last winter bought one hundred and forty thousand of them in Idaho alone. This has enabled a number of men in that state to pick up a nice piece of extra money and has, naturally, greatly aided the control work.

For historical reasons, if for no other, some rodent control work done a year or two ago in Kern County, California, in coöperation with state and county agencies, deserves more than passing notice. This was the campaign in that region against a plague of house mice rivalling the great plague of field mice that occurred in the Lovelocks region of Nevada twenty years ago. More than seventeen thousand acres of the infested area were treated with more than twenty tons of poisoned grain, systematically placed in trenches, and the infestation was eventually got under control.

It will be recalled that in the Lovelocks plague the balance of nature was of material assistance in checking the spread of the abnormally abundant rodents. The Survey Report for 1908, in speaking of this circumstance, declared:

The Nevada outbreak furnishes an important object lesson as to the value of certain birds and mammals to the farmer. As soon as the mice began to increase markedly, hawks, owls, ravens, gulls, and herons among birds, and badgers, skunks, weasels, foxes, and coyotes among mammals hurried to the scene and made the pursuit of mice the chief object of life, most of them in fact subsisting entirely on the mice. It was estimated that during the height of the outbreak the birds and mammals enumerated destroyed some forty-five thousand mice daily. Although their combined assaults unaided did not suffice to abate the plague, yet when the number of mice was reduced by poison, and long before it approached the normal, they were able not only to prevent increase but to cause a rapid decline, which continued until the mice became so scarce that the predatory birds and mammals were forced to scatter and look elsewhere for food. It is fair to infer that had these friends of the farmer been protected in the beginning they would have

been able from the first to hold the mice in check, preventing the abnormal increase so that there would have been no plague.³³

In the more recent California seething-up, the balance of nature does not seem to have been of a degree of assistance equally effective. It made itself felt, but seemingly to a considerably milder extent. It is interesting to note in this connection that some criticism of the Survey's anti-coyote efforts was given expression in California while the fight against the mice was in progress; the gist of the argument being about that which appears in the last sentence of the quotation just made. In other words, it was intimated that if there had been more coyotes there would have been fewer mice.³⁴

These differing points of view are presented for what they may be worth and in order that the reader may note two things. One is that human points of view are likely to be influenced by the whose-ox-is-gored consideration. Thus, the California criticism of coyote elimination was based upon an agricultural interest which looked with kindly eyes upon the coyote because the coyote did not eat up its crops³⁵ but did eat up the mice that ate up its crops. On the other hand, the anti-coyote point of view, hitherto referred to, was based upon a stock-raising interest which looked upon the coyote only in connection with his inroads upon flocks and herds. All of which illustrates graphically the fact that a governmental service such as the Survey, is always and forever up against the same quicksilver thing that the gentlemen who are in politics have constantly to bear in mind—that is to say, human nature. In wild life control, as in legislation, it is not the simplest thing in the world to please everybody.

The other thing to be noted is that in this difference of opinion about mice and coyotes there reposes an excellent illustration of the point brought out at the close of the preceding chapter; namely,

³³ P. 5.

³⁴ "An Outbreak of House Mice in Kern County, California." By E. Raymond Hall. University of California Publications in Zoology, XXX, 189-203.

³⁵ He may not have done so in this instance; but that the coyote is not only not always strictly carnivorous, but sometimes "vegetarian" to a degree damaging to orchardists, vinyardists, and truck gardeners is demonstrated rather convincingly in an article in the January, 1928, issue of the monthly bulletin of the California Department of Agriculture, p. 26.

that scientists differ occasionally just as common mortals do. The Survey is a thoroughly scientific organization, trying to do its job in as scientific a manner as possible; which, when translated into plain language, means according to common-sense principles based upon ascertained and organized facts. Yet the California criticism was, to a degree at least, a scientific criticism.

This matter of individual interest received an illustration from yet another angle at the 1927 convention of the American National Livestock Association, the great national cattlemen's organization; which maintains a standing committee, by the way, on "Predatory Animals," but lets the rodents take care of themselves. A speaker at this convention was the Director of the Utah Agricultural College, a gentleman who, needless to say, has numerous contacts and interests on both the herder and the farmer side. In speaking upon a subject which was much discussed at the convention—public control of the public domain—he took occasion to say that such control should aid in the eradication of both predatory and noxious animals; and, in elaborating his theme, he declared that the coyote in earlier times had done much to keep the rodent within bounds. From this he argued that if the government removed coyote pressure upon the rodent it should be prepared to stop the rodent seethe-up which would inevitably follow. It was a question, he told his auditors, as to which did the most damage, the predatory or the noxious. Incidentally, he called attention to yet another form of destructive wild life which has gone practically uncontrolled so far; the herds of wild horses and burros that are consuming public forage that should be converted into beef or mutton.

Before passing from this matter of rodent and predatory animal control, a word should be said of another important way in which the national government, through the Survey, gives most important coöperation in it to the localities engaged in combating these pests. Mention has already been made of how the Eradication Methods Laboratory at Denver, "processes" rodent foods and sells them to the coöperating communities at cost. It also buys and processes various of the mineral poisons for use against predatory animals—the effect of the processing being to "slow up" the distinctive flavor of the poison so that the wolf or coyote swallowing it in a ball of tallow, or what not, will "keep it down" long enough for

it to get in its work. The following quotation will be illuminating on this point:

By taking advantage of the Government's ability to purchase strychnine at a very close figure and having it processed at its laboratory to delay the bitter taste, we have been able to furnish poison to a great many stockmen and a few private trappers. The private trappers are loath to use poison as the coyotes often go a great distance after taking the poison and are not found, and as they must have the fur to make the work pay they would rather stick to trapping.³⁵

The work done by the Survey in connection with the combating of the house rat is mostly confined to the large cities and is chiefly of an advisory nature, though rat campaigns in cities have been, and are, to some extent, organized by it. But it is mostly by the delivery of lectures, the dissemination of appropriate publications, and the suggesting of remedies when requested by municipal authorities or business houses that the work is done.

Though the vast bulk of the work is done in the cities, it is not all done there. A successful rat-killing campaign was recently organized in one of the counties of Texas by the leader of the Survey's rodent control work in that state.

In addition to the mediums for the dissemination of methods of rat control just referred to, the motion picture film is also extensively utilized to outline graphically the methods recommended by the Survey. A recent film, prepared by the Department of Agriculture's Office of Motion Pictures with the Survey's assistance, illustrates the use of red squill about poultry houses and in other places where farm animals might be endangered by the use of more virulent poisons. Fumigating with gases is also illustrated in detail, as well as other methods.

These efforts have not been without result. They have produced heightened sanitary requirements, building regulations emphasizing rat-proofing, greater care in foodstuff preservation and food waste disposal, and a better general understanding of the disease-spreading potentiality of the rat. As a consequence, it can be stated with considerable confidence that this animal is probably on the decrease in the United States to-day.

³⁵ Nevada State Rabies Commission, Biennial Report, 1925-1926, p. 4.

What may be termed the final effort of the Survey in the work of the discouragement of undesirable forms of wild life consists of the educative, or propaganda, work that it does. By the spoken and the written word and by the just-mentioned medium of the motion picture, it directly, and in coöperation with the Extension Service of the Department of Agriculture, spreads throughout the country a knowledge of the importance of this work in the repression of destructive wild life.

To these means of spreading a knowledge and understanding of rodent and predatory animal control there has recently been added the tremendously far-reaching instrumentality furnished by radio broadcasting. Air talks by field men on the why and the how of eradication are now being given with increasing frequency.

Wild Life Protection. The protective activities of the Survey of a direct nature are those having to do with the enforcement of the Migratory Bird Treaty Act and the Lacey Act. In an indirect way, through its relations with the Alaska Game Commission, it assists in the protection of wild life in that northern territory.

It has been well said that the charging of the Survey with the enforcement of the Lacey and Migratory Bird Treaty Acts is really only a nominal charging in view of the fact that Congress has never appropriated funds for more than from twenty-five to thirty wardens to cover forty-eight states, a thing that would be no easy job for a force four times as large. It is also well known to those in a position to know that contrabrand game has not entirely disappeared from the markets of the larger cities. A great deal of it changes hands in a certain great Mid-Western city. It is not unobtainable for a consideration in many Atlantic seaboard cities. In the national capital itself, it is not impossible to obtain it.

From the foregoing it might be gathered, at first blush, that the national and state legislation which has been enacted during the past thirty years, aimed at trafficking in wild fowl and other game birds, and the administrative effort which has been put forth thereunder, have constituted a mere essay in futility. But this is by no means the case. To be sure, the laws are violated, and violated to no mean extent. They will continue to be violated so long as human nature is what it is: so long as there exist in numbers in our large cities so-called ladies and gentlemen longer on cash than on character who are willing to compound law-breaking in order

to give a "smart" dinner. So long as the game continues to be thumpingly worth the candle, there will be found shack-dwelling beach combers about our flats and marshes and estuaries, who will gun for market in spite of the game warden.

But this is only one side of the picture. If you look at this illegal leakage from the wild fowl flocks, and look at it alone, it bulks somewhat alarmingly large. When you compare it, however, with the leakage of the good old days, when the business arrangements between the city buyers and the feeding-ground shooters were "open covenants openly arrived at," you note that the comparison is between a trickle and a torrent.

Furthermore, it is a leakage that is getting progressively smaller because the creating of it is getting progressively more difficult. As the years go by, there is coming to pass an improvement in enforcement both as regards quality and quantity. Game wardens, both state and national, are getting to be better game wardens, and they are becoming more numerous, though they still—and especially the federal ones—are far from being numerous enough. Coöperation of the enforcing officers is improving. Finally, there is to be reckoned the great and growing force of sportsmanship among the great mass of our citizens who gun for pleasure and recreation. Unselfishness, consideration for the rights of the shooting fraternity at large, self-restraint, and an intelligent comprehension of the fact that the real reason for our game laws is the perpetuation of sporting opportunity—these things are not yet as universal as they might be. But it can be laid down most emphatically that the improvement along these lines in America during the past quarter century has been very great, and that no signs exist of any reactionary tendency.

Upon coöperation between national and state game authorities has depended much of the success attained in the enforcement of the federal wild life statutes in the past, and is depending more and more of the success being attained at the present time. This coöperation, taking the country as a whole, is not yet one hundred per cent perfect, but it can safely be said to be a thing that is constantly on the make; reflecting, in its trend, the improving ideals of sportsmanship and the increasing comprehension on the part of the public at large of the necessity for the replacing of the heedlessly wasteful ideas of the past with the conservational methods made imperative by the increasing complexity of civilization.

To get a close-up view of this national-state coöperation as of the present time, a consideration of the following is to be commended:

In the enforcement of the Federal and State game and fur laws there is such coöperation between the Federal and State enforcement agencies as to give concern to violators and others not inclined to observe the laws. Two concrete examples will demonstrate how the Federal and State Governments are coöperating, one showing how a State is assisting in the enforcement of Federal game regulations and the other how the United States game wardens employed by the Biological Survey aid the various States in apprehending violators of their game and fur laws.

Recent Federal regulations under the migratory-bird treaty act made the opening date of the season on wild ducks in California October 16, and thus rendered ineffective the provisions of the State law that would have opened the season on October 1. Under the same regulations the season might continue until January 31, except for the fact that the California law now in force would be violated by hunting after January 15. Both the State law and the Federal regulations contemplated a season of three and one-half months, but the four months' maximum extent under the conflicting dates is actually shortened to three months, the Federal regulations cutting off the first half of October allowed by the State, and the State law lopping off the last half of January provided by the Federal regulations.

To help enforce the Federal regulations, the California Fish and Game Commission not only gave wide publicity to the deferred opening date but at the same time served warning that the provisions of the regulations adopted by the Secretary of Agriculture and promulgated by the President would be rigidly enforced by all its State wardens, who were instructed to coöperate with the United States wardens to this end. The only hope that California's sportsmen have of enjoying a full waterfowl season of three and one-half months lies in the possibility that the State legislature, when it meets in January, may act on a proposed measure to add two weeks to the end of the season to make it conform with the season allowed under the Federal regulations.³⁰

The Federal Government in turn can give assistance to State authorities through the fact that United States game wardens, in the course of their activities in the enforcement of the migratory bird and other Federal game laws, constantly encounter violations of State laws. Each of these wardens is thus in position to render substantial coöperation to State authorities in the enforcement of their game, fish, and fur legislation. Examination by United States game wardens of the records of raw-fur receiving houses has

³⁰ Which the legislature did not do.

proved a fertile field of coöperation, and thousands of reports of apparent violations of State laws protecting fur animals and regulating the shipment of pelts are annually referred by Federal wardens to State game authorities for investigation. In many instances it is necessary to follow up these reports and still further aid the State in prosecutions by obtaining consignee affidavits covering the receipt of shipments and the original canceled checks for payment, and in many cases the original correspondence between the shipper and the consignee. There is a good percentage of State convictions based on this information, and the value of this Federal service is being appreciated more and more by the various State game departments. For the past few years penalties and forfeitures accruing to the States as a result of information furnished by United States wardens have amounted to from \$20,000 to \$25,000 annually.³⁷

An important duty of the Survey in connection with the Migratory Bird Treaty Act is the making of new regulations thereunder with reference to the changes in bag limits, length and times of shooting seasons, etc., that are made from time to time as conditions warrant. These changes are made through the instrumentality of the Migratory Bird Treaty Act Advisory Board, an organization not created through any requirement of the treaty or the act, but appointed by the Secretary of Agriculture, under his general powers, to act in a purely advisory capacity.

This board was first established in 1913 after the original Migratory Bird Act had been passed. Its creation was the result of a suggestion of the Survey, and the suggestion was made for the reason that the Survey, just clothed with the authority for the enforcement of the act, did not conceive that it would be good policy for it to appear before the country in the shape of a bureaucratic dictator. Instead, it was proposed to preserve friendly relations with the public by asking the public's advice in the administration of the law.

Accordingly, a board of fifteen members was set up, most of them being state game officers from all over the United States, and the balance being outstanding conservationists. Later, the board was increased to twenty-two.

The board meets every fall after the Survey has closed business for the year, and considers suggestions for proposed changes in the regulations based on the year's experience. These suggestions are

³⁷ *Official Record*, November 24, 1926, p. 8.

submitted to the board for consideration and recommendation. The Secretary then passes upon the recommendations of the board and decides finally for or against their adoption. The chairman of the board and the rest of its members have no information regarding the proposed changes prior to their submission to them by the Secretary. The board, however, may informally, at its yearly meetings in Washington, submit other matter for discussion. Matter thus brought up is sometimes translated into recommendations and adoptions by having formal action taken upon it the same as if it had originated in the regular way.

To illustrate the working of this system—it was recommended in the fall of 1926, and later adopted as an amended regulation, that sink boxes could not be used in the hunting of migratory wild fowl in strictly inland waters, and in coastal waters only when seven hundred yards from other sink boxes and from the mainland or islands at ordinary high tide. After trying this out for a year, it was decided in the fall of 1927 to retain it so far as inland waters were concerned but abolish it with regard to coastal waters.

Originally, the bird plumage confiscated under the provisions of the 1921 tariff act was destroyed. Now it is turned over to the Survey to be sent over to the National Museum for distribution to museums needing it or to educational institutions in order to spread a knowledge of the prohibited species. Frequently, the Survey's game wardens run across this contraband in their trips about the country—usually in the possession of milliners who have purchased it. They call the attention of the milliners to the risk they are running, and in the majority of cases the material is at once surrendered to them without protest.

In connection with the general subject of the game protectional activities of the Survey is to be considered the matter of game, bird propagation, or game farming, as it is generally called. A rein is kept upon this industry, which might otherwise be a prolific source of defeating the purpose of the Migratory Bird Treaty Act, by the requirement that permission from the Secretary of Agriculture is necessary before migratory birds can be kept in captivity. The issuance of permits to follow this business is governed by Regulation 8.

On the national forests all game is protected by the forest officers and their assistants as a regular official duty, the comparative importance of which is regarded as "almost second to forest preser-

vation.”³⁸ The results of this protection have been most encouraging, and constitute no small part of the favorable situation with regard to desirable forms of animal and bird life—and especially the former—which obtains to-day. Elk, deer, and wild turkeys have shown large increases in every national forest located in regions where such game was originally abundant. Elk and deer have increased to such an extent in some forests as to have become annoyances to neighboring farming communities, recalling those colonial days when settlers had to “slaughter” game to protect their crops. Some of the elk represented in these increases are the results of “plants” from other areas, such as the Yellowstone, but for the most part the improved situation is simply the consequence of rational protection giving nature a chance to take its course. Beaver, too, have greatly increased on the forests. A careful estimate of January, 1926, showed forty-seven thousand beaver on the streams in the national forests in Colorado alone.³⁹

The Survey, naturally, is keenly interested in the wild-life situation on the national forests, and in the growing tendency in forestal science toward the making of the acquisition of wild-life conservational knowledge a part of the forester's training. This tendency has been noticeable of late in the forest schools.⁴⁰ At the University of Michigan, for example, the School of Forestry gives courses in the conservation of wild life, game management, and forest zoology. To schools offering such courses the Survey gives all possible coöperative assistance, in the shape either of the giving of lectures by its officers, or the furnishing of information on forestal biological relationships which it has accumulated in its forty years of investigation.

The close relationship between forestal administration and wild life control is strikingly illustrated by the case of the deer of the Kaibab National Forest in Arizona. The efficient protection given these animals by the forest rangers brought about their increase, a few years since, to a point where the forage in the forest was not sufficient to support them in their augmented numbers. The result was such an intensive grazing of the herbage and browse

³⁸ “Game, A Forest Asset—and Sometimes a Liability,” by Will C. Barnes, *Forest Worker*, May, 1926, pp. 20-23.

³⁹ Also in legislation touching upon forest research. See the act of May 22, 1928 (45 Stat. L., 711), under which a considerable enlargement of the Survey's investigational activities will probably be made.

as to threaten its complete destruction; coupled with great damage to the forest itself, particularly the young growth thereof, caused by the starving animals turning to tree growth for food. The problem thus presented was investigated by the Survey in coöperation with the Forest Service, and it was decided that the only remedy for the really desperate situation was the drastic reduction of the numbers of the deer to a figure capable of being fed by the potential forest range. The only alternative to this plan seemed to be the destruction of the forest by the deer and their own destruction in the process. Concretely, the plan devised called for the killing of deer within the forest in large numbers,⁴⁰ at seasons and under conditions not in conformity with the game laws of Arizona.

At once an uproar arose. The uninformed and uninformed sentimentalists and the professional humanitarians began to protest from one end of the country to the other—precisely as they had in the case of the Stanislaus deer and in that of the Boston sparrows—about wanton butchery, etc.; and in the midst of the din the State of Arizona insisted upon enforcing the state game laws strictly throughout the forest area, thoroughly emasculating by this action the national government's plan for a drastic reduction of the numbers of the deer to a level the forage could feed. This forced the government to "go to law about it," as a consequence of which there was finally handed down, in May, 1927, a decision⁴¹ completely upholding the right of the United States to protect all growth on government lands by any method within its discretion—including the killing of game on its own land in ways and in quantities not in conformity with the law of the state in which the land might be situated. The decision placed only one restriction upon the national government. It forbade the licensing of hunters to transport deer killed on the forests to points outside the state in violation of the state's game export laws.

The impasse created in this case of the Kaibab deer by conflicting state and federal authority, an impasse which enforced slow action when quick action was needed, is illustrative of the fact that American game administration to-day is hobbled rather seriously

⁴⁰ A careful census of the Kaibab deer made in 1925 showed that they numbered approximately thirty thousand—just about twice as many as forage of the forest can properly support.

⁴¹ *United States v. George W. P. Hunt et al.*, 19 Fed. (2 Ser.) 634.

by a wide-spread misconception as to what it is all about. America very largely still does not see the wild life problem clearly and as a whole. In a manner of speaking, America cannot see the herd for the deer. This situation has recently been given excellent expression in connection with a wild life crisis similar to the one on the Kaibab in another part of the country. In the report made in July, 1927, upon the conditions surrounding the Jackson Hole elk by the special commission appointed by the President's Committee on Outdoor Recreation, it is well said that

In this country the science of game administration should be more clearly understood by the public. It is not the mere exercise of police power for the protection of numbers of game. Unhappily American game to-day is still largely in the era of mere protection, and dependent for existence upon inelastic statutes which do not conform to changing conditions and customs. Indeed, not infrequently, these statutes violate fundamental principles of biology.

Game administration includes rational protection of wild life adjusted to changing conditions, and excludes unnecessary and unmerciful waste. Over-protection, paradoxical as it may seem, defeats its end, and under its stimulus certain types of game animals multiply beyond their means of subsistence and cruel starvation ensues.

The restriction of the importation of wild birds and mammals under the Lacey Act is one of the activities of the Survey which partakes of the nature of more than one of the classifications mentioned above. It is wild life encouragement in the sense that it tends to increase the wild life of the country. A case in point is that of the more than eighty-five thousand quail which were permitted to be imported from Mexico in 1926 and 1927 through the border ports of Laredo, Eagle Pass, and Brownsville⁴² for distribution throughout twelve states from Texas to Pennsylvania.

But it can also be wild life discouragement, as it certainly was in the case of the European hares which a rod and gun club of Maryland unsuccessfully tried to import in 1927. The shipment was refused entry at New York by the customs authorities at the request

⁴² Regulation 2 of the "Regulations for the Issuance of Permits for Bob White Quail Imported into the United States from Mexico" jointly issued by the Secretaries of Agriculture and the Treasury in December, 1927 (S. R. A.—B. S. 69), establishes these three border towns as "inspection stations," and states that no permits for the entry of these birds from Mexico will be issued through any other port.

of the Survey because it was felt that their introduction was likely to be damaging to agricultural interests. They were destined for a point not far removed from the important apple growing district of the Shenandoah Valley, and it was recalled that some of these hares that were allowed to be introduced into New York, Massachusetts, and Connecticut some years ago for coursing purposes got away from the hounds and caused enormous losses to the orchards of the Hudson Valley and Western Massachusetts.

From still another viewpoint the regulation of these importations may be regarded as wild-life protection. By keeping out such pests as the mongoose it unquestionably prevents immense destruction of the nests and eggs of American birds.

Though there is nothing approaching laxness in the enforcement of this part of the Lacey Act, every effort is made to make the procedure as simple and expeditious as possible in order to avoid inconveniencing the importer. The permits are got up in large books, like check books, with perforated stub ends. Each permit and its corresponding stub bear the same number. When a request for a permit to import comes to the Survey, the permit is at once sent to the importer—unless importation cannot be granted—filled out with a description of the animals or birds to be brought in and other essential data, and unstamped if the importation is to be allowed without inspection, or, if with inspection, stamped to that effect. The importer presents this permit to the customs authorities at the port of entry and gets his shipment. The customs authorities, at the end of the month, return the used permit to the Survey for checking up with its records.

In issuing importation permits, care is also taken to see to it that the laws of the nation of origin are complied with. Thus, owing to the fact that Mexico has recently placed restrictions on the export of certain cage birds, importers of such birds from Mexico into the United States must now file with their applications for importation permits authorization from Mexican officials allowing the shipment of the birds out of that country.

Of all the activities which have been detailed above there is, it is scarcely necessary to state, supervision. The responsible heads of the several lines of work lay the work out by careful planning and then keep in touch with it, partly through the medium of required periodic reports from their subordinates in the field, partly

through the exchange of correspondence upon details of the projects under way, and partly through field trips of inspection. In general it may be said that at all times the supervisory procedure calls for knowing what every member of the personnel is doing, and where and how he is doing it—the ideal aimed at being enough supervision to prevent haphazardness and duplication of work and not enough to throttle healthy individual initiative. This applies to the Service as a whole, as between the Chief and the heads of the several divisions; and in the divisions, as between the heads and their several subordinates—in other words, a straight line, down-from-above supervision.

CHAPTER III

ORGANIZATION

For the performance of the activities detailed in the preceding chapter the Biological Survey is organized into the five divisions of Biological Investigations, Economic Investigations, Food Habits Research, Fur Resources, and Game and Bird Conservation. Each one of these divisions is organized for work in Washington and work in the field. In addition to these divisions, and at the apex of the general organization of the Bureau, is the Office of the Chief, with its various sections designed to handle the purely administrative work of the Survey as a whole. Consideration of these several units will be taken up in the order given.

Division of Biological Investigations. This Division administers the work in the life habits and classification of wild animals, the geographic distribution of wild animals and plants, the life-zone investigations and biological surveys of definite areas, the studies in bird migration, the work in bird, including wild fowl, censuses and bird banding, the big game investigations, such as that now being carried on at Jackson Hole, and the investigative work for the improvement of the reindeer in Alaska, including the work being done at the permanent reindeer experiment station located in that territory. The Division is under the direction of a biologist in charge, with one senior biologist, five biologists, and one associate biologist under him. Attached to the Division also are four scientific aids in charge of the work which the Division performs in connection with the Survey's collections of birds and mammals in the National Museum. One of these scientific aids is also a taxidermist. Requisite clerical assistance is provided.

In addition to the foregoing, who constitute the divisional staff at Survey headquarters in Washington, a number of the personnel of the Division are stationed at the several field headquarters which the Division maintains in its work in various parts of the country. Thus, at the reindeer experiment station at the Alaska Agricultural

College in Fairbanks, Alaska, there is a biologist in general charge of the station and of the grazing investigations being carried on throughout the reindeer country. In this work he is aided by a range examiner.

At the field station maintained at Tucson, Arizona, for the study of the habits of mammals—particularly the Southwestern rodents—in relation to crops and forage, there is a biologist and field naturalist.

At Puyallup, in the State of Washington, a field station similar to the one at Tucson is maintained for the purpose of keeping an eye on the Northwestern rodents in that important orcharding, farming, and gardening region. It is in charge of an associate biologist and field naturalist.

The list of the Division's field headquarters is completed by the one recently established at Jackson Hole, Wyoming, for the intensive study of the elk of that region that resulted from the Washington Elk Conference in 1927 that was fostered by the National Conference on Outdoor Recreation.¹ It is in the charge of an associate biologist and field naturalist.

Division of Economic Investigations. The large personnel of this Division is almost altogether a field personnel, as might be expected from the nature of its work—the combating of predatory animals and rodent pests throughout the country. Its directive staff in Washington is a small one—merely a senior biologist in charge, with a biologist assisting him. There is also located at the Survey headquarters in Washington, however, the headquarters of the rodent control district for the Eastern United States in charge of a rodent control leader, with an assistant biological aid under him. To this district headquarters field stations at Lafayette, Indiana, Amherst, Massachusetts, and Raleigh, North Carolina, each in charge of a junior biologist, make their reports.

The balance of the field service of this Division comprises the Eradication Methods Laboratory at Denver, Colorado, and districts

¹ It should be noted, however, that for the purposes of field work in the Eastern United States the Washington Office is itself regarded as a field headquarters. Various members of the Washington staff go out from time to time to conduct field investigations in the eastern parts of the country as occasion requires.

for rodent and predatory animal control in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming, and in South Dakota and Nebraska in combination. In addition there is a district in Kansas concerned with rodent control only,² and one in Alaska concerned with predatory control only, in coöperation with the territorial government.³ In the majority of cases the headquarters for both rodent and predatory work in these districts are located in the same place.⁴ Occasionally, however, conditions make it necessary for rodent headquarters to be located in one town and predatory headquarters in another. This is the case at present in Idaho, Montana, and Wyoming.⁵

Sometimes in these districts the offices of rodent and predatory leaders are combined in one man. This is the case at present in the Colorado, Nevada, New Mexico, Wyoming, and South Dakota-Nebraska districts. In most cases, however, there are separate leaders for the two lines of control work. In such cases each leader is independent of the other. Generally in the districts with headquarters in the same towns, though not always, the two personnels occupy the same offices.

The personnel at these district headquarters, including the clerical assistance which is provided, generally averages about five per-

² The Survey, however, does coöperative coyote extermination work in Kansas, hunters being sent in from adjoining predatory districts for the purpose.

³ Organized predatory animal work is also planned to be inaugurated in Arkansas and Oklahoma in the near future; those states having arranged to make coöperative funds in excess of \$20,000 available by July 1, 1928.

⁴ The following districts have combined headquarters: Washington, at Olympia, with a rodent sub-station at Puyallup; Oregon at Portland; California, at Sacramento, with a rodent sub-station at Berkeley; Nevada, at Reno, with a predatory sub-station at Ely; Utah, at Salt Lake City; Arizona, at Phoenix; Colorado, at Denver, with predatory sub-stations at Monte Vista and Montrose; New Mexico, at Albuquerque; Texas, at San Antonio, with a predatory sub-station at Canyon. The South Dakota and Nebraska district has a single headquarters for both lines of work in Rapid City, South Dakota. The headquarters for the Kansas district (rodent work only) is at Manhattan: that for Alaska (predatory only) is at Juneau.

⁵ Predatory headquarters for Idaho is located at Gooding: rodent at Boise, with a rodent sub-station at Pocatello. Wyoming's rodent headquarters is at Laramie: predatory at Cheyenne, with a predatory sub-station at Sheridan; Montana's rodent headquarters is at Bozeman: predatory at Billings.

sons. Oregon has eight, Washington seven, and Utah six. Alaska has but one man, the leader in predatory animal control. Kansas, which deals with rodent work only, has three. The Texas headquarters, which may be taken as fairly typical, includes a leader in rodent control, a junior biologist, a leader in predatory animal control, an assistant leader in predatory animal control, and a clerk. Under the direction of the predatory control officers in charge of the predatory work in these districts are between five hundred and six hundred predatory animal hunters paid partly from federal and partly from coöperative funds.⁶ Both the predatory control officers and the rodent control officers are expected to render aid in the combating of bird pests that may chance to develop in their districts. In addition, the rodent men of the eastern control district are expected to give assistance in the control of other mammals than rodents as occasion may require.

The eradication methods laboratory at Denver, where experiments and studies are made in the compounding of predatory and rodent poisons for use in the field, is in the charge of an associate biologist, with two assistant biologists under him. Skilled labor and clerical assistance is also provided at the laboratory. There is also attached to its staff an associate biologist who is actually stationed at Berkeley, California; where, from the rodent sub-station for the California district, he carries on field experiments in rodent poisoning work. Field experiments in both rodent and predatory work are also conducted from the Denver laboratory itself.

Division of Food Habits Research. The work of this Division is performed for the most part in the laboratory at Washington, where the work of stomach examination of birds, mammals, reptiles, and amphibians is carried on. It is in the charge of a biologist, who has under him a staff consisting of two biologists, two associate biologists, two assistant biologists, two junior biologists, and a laboratory assistant. Clerical assistance is provided.

⁶ This statement does not apply to the recently-established Alaska predatory animal district. The leader in that district has no predatory animal hunters under him. His work is, so far, almost entirely of an instructional nature. He demonstrates control methods—principally as regards the wolf—to the Alaska Game Commission's force of eight game wardens, and, to some extent, to interested Alaskans in a position to assist in the work.

The bulk of the field work of this Division is centered at the two field stations in Georgia; at Beachton, where the field headquarters is located, and Thomasville. It is in this region that the Division is carrying out the quail investigations in coöperation with the committee representing the quail study fund for Georgia and Florida. The work is under the control of two field assistants, who are provided with the requisite field laboratory facilities and the necessary clerical assistance.

In addition to the work indicated above, this Division is also in charge of the work having to do with the general question of the propagation of game birds throughout the country, with the surveys of the food resources of water-fowl, with the methods of attracting birds about homes, parks, and other places, and with the working out of methods for the control of injurious birds.

Division of Fur Resources. The Washington work of this Division is in charge of a biologist trained in animal industry, who has under him an associate biologist. The work consists of the supervision and administration of the fur-bearing animal work which the Survey performs—the investigation of the problems of the fur farmer, including the study of diseases and parasites, the encouragement of the conservation of wild fur-bearing animals, and investigations of the methods of the propagation of small animals for pets and for laboratory use.

The Division's field work consists partly of visits of study and inspection to the fur farms of the country, but principally of the work being done at the two experiment stations under its control, the fur experiment station at Saratoga Springs, New York, and the rabbit experiment station at Fontana, California. The staff of the fur experiment station consists of an associate biologist and veterinarian, who is in charge, and a biological assistant and junior animal husbandman. A biologist is in charge of the station at Fontana also assisted by a junior animal husbandman. Both sections are equipped with the requisite laboratory facilities and have the necessary clerical assistance and labor.

A biologist of the Division attached to the Washington headquarters is stationed at St. Paul, Minnesota, in charge of the fur animal epizootic disease work being done in coöperation with the Medical School of the University of Minnesota.

Division of Game and Bird Conservation. The work performed by this Division is of such a nature that it can be called very appropriately the regulatory arm of the Survey. It administers and enforces the four outstanding wild life statutes, the enactment of which during the past approximate quarter-century has coincided with that growth in national wild life conservational sentiment which has been reflected in the development of the Survey. These statutes are the Lacey Act of May 25, 1900 (31 Stat. L., 187), as strengthened by the codification of March 4, 1909 (35 Stat. L., 1088); the Bird Refuge Act of June 28, 1906 (34 Stat. L., 536), as enlarged and strengthened by the acts of March 4, 1909 (35 Stat. L., 1088) and April 15, 1924 (43 Stat. L., 98); the Migratory Bird Treaty Act of July 3, 1918 (40 Stat. L., 755); and the Upper Mississippi River Wild Life and Fish Refuge Act of June 7, 1924 (43 Stat. L., 650), as amended by the joint resolutions of March 4, 1925 (43 Stat. L., 1354) and May 12, 1928 (45 Stat. L., 502). In addition it acts for the Survey in all Alaskan matters not of a purely research or investigational nature and thus comes into close contact with the regulation of wild life affairs in that northern territory by the Alaska Game Commission under the Alaska Game Law of January 13, 1925 (43 Stat. L., 739). Those regulations under this law the preparation of which is the province of the Secretary of Agriculture, it prepares. In fact, as the representative of the Survey, it acts for the Secretary of Agriculture in all respects under the law mentioned. This includes the issuance of permits for fur farming and for grazing of domestic stock on those Alaskan islands which are under the Survey's control.

This Division is also in charge—as a necessary incident to its administration of the act relative to the protection of birds, animals, and property on reservations—of the maintenance and operation of the five big game refuges, a function that involves a considerable variety of activities—rough veterinarianism, fence building and repair, destruction of predatory animals, disposal of surplus big game stock, and, in the case of the Jackson Hole Refuge, hay raising and storing on a fair-sized scale.

The Division is in charge of a United States Game Conservation Officer,⁷ assisted by two deputy officers. The Washington staff

⁷ Formerly Chief U. S. Game Warden.

also includes four administrative assistants and two biologists. The necessary clerical assistance is provided.

Full time United States game protector* service is maintained in territories adjacent to the following places: Mobile, Alabama; Little Rock, Arkansas; Berkeley, California, Daytona Beach, Florida; Savannah, Georgia; Peoria, Illinois; Russellville, Kentucky; Portland, Maine; St. Paul, Minnesota; Kansas City, Missouri; St. Louis, Missouri; Billings, Montana; Omaha, Nebraska; Atlantic City, New Jersey; Socorro, New Mexico; Owego, New York; New Bern, North Carolina; Columbus, Ohio; Portland, Oregon; Memphis, Tennessee; Houston, Texas; Locustville, Virginia; and Spokane, Washington. Occasionally, in the spring or fall, some of the protectors are concentrated in territories most in need of their services. One marine engineer and pilot holding a game protector's commission is also employed in connection with this work.

Besides these full time protectors there are, under what might be termed "on call" appointment, between six hundred and seven hundred deputy United States game wardens throughout the country. These men are generally put on active duty only at times of the year when the Division is especially busy. They are paid on a *per diem* basis. A number of state game wardens are also empowered to act as United States deputy wardens, serving without salary.

For the regulation of the importation of birds and mammals the Division maintains field headquarters in Los Angeles, San Francisco, Baltimore, New York, and Philadelphia. At these places importation inspectors, in the shape of local qualified ornithologists and mammalogists, are on call to examine importation of birds and animals at a stated fee per examination. The necessary examinations on the Mexican border are made by coöperating officers of the Bureau of Animal Industry. Three inspecting officers of that bureau are "taken over" by the Biological Survey so to speak, during the importing season for quail, which extends from February 15 to May 30, under a coöperative agreement. During this season the Survey pays the salaries of these officers. It might be stated in this connection that in the case of quail imported from

* Formerly warden.

Mexico, just as in the case of certain song birds which has already been mentioned, the Survey is under obligation to see that certain exporting restrictions of the Mexican Government are carried out. Those restrictions, in brief, are that the concessionnaires granted permission to export quail shall export a certain number of birds, through certain specified border ports of entry⁹ to certain specified American states, and nowhere else. These concessionnaires, in addition to the import duty they pay the United States, are required to pay three Mexican export duties—federal, state, and municipal.

The Division maintains full time reservation protectors¹⁰ at the five big game refuges: the Montana Bison Range, The Niobrara Reservation, Sullys Hill and Wind Cave National Game Preserves, and the Jackson Hole Elk Refuge. The necessary labor and clerical assistance is provided at all five of the refuges.

Full time reservation protectors are also maintained at six of the principal bird refuges. At five others protection is had from coöperative protectors, either private citizens donating their services, or Bureau of Reclamation employees stationed in the vicinity of the refuges they look after.

For the Upper Mississippi Wild Life and Fish Refuge, with headquarters at Winona, Minnesota, a considerable staff is maintained. Besides the superintendent, there is a land valuation engineer with one assistant, an attorney with two assistants, an administrative assistant, two foresters, seven rangers, six patrolmen, and a transitman. The necessary labor and clerical assistance is provided.

As this is being written the organization of the personnel for the creation of the Bear River Refuge has only been begun. A superintendent has been appointed—a former state game warden of Utah—and an engineer has been selected to look after the technical end of the work. Further plans and appointments, as well as the selection of a headquarters for the prosecution of the work, are in abeyance.

Direction of the Survey in General. The directing head of the Bureau of Biological Survey is the Chief of the Bureau, who has to assist him, an Associate Chief, and an administrative assistant

⁹ Laredo, Eagle Pass, and Brownsville.

¹⁰ Formerly wardens.

for general supervisory work. Of three other administrative assistants, two are in charge of business operations, including accounts, property, mails and files, and personnel records; and one looks after exhibits, photographs, and publications. Finally, there is an editor, with one assistant in charge of all informative and editorial work, and answerable directly to the Chief of the Bureau.

The Survey's Plant. The greater part of the Washington personnel of the Survey is housed in the Bieber Building at 1358 B Street, S. W. The Food Habits Research Division, the principal exception, is in Building F on the Mall.²² This is one of the temporary buildings erected during the World War. Incidentally, it is an exceedingly inflammable structure, and would not seem to be the best place conceivable in which to house the immensely valuable records of this Division, representing the fruit of the research in stomach contents examinations for a period of over forty years.

As before related, the personnel of the Division of Biological Investigations in charge of the Survey's collections is located in the National Museum. The taxidermist of this Division has his shop in the rear of the Bureau of Chemistry Building at 216 Thirteenth Street, S. W. The photographer—attached to the office of the Chief of the Bureau—is located in the Photographic Laboratory of the Department of Agriculture on Linwood Place, S. W., in the immediate neighborhood of the Bieber Building.

In its game protective work the Survey has found a navy a necessity. At various points on the coast and inland waters it maintains eighteen power boats, some of them boats of fair size, designed and constructed under supervision of the Survey; besides a number of smaller boats equipped with out-board motors. Three large power boats are also maintained by the Alaska Game Commission for use in the protective work in that territory. As before stated, the chief representative of the Survey stationed in Alaska is the *ex-officio* executive officer, secretary, and fiscal agent of that Commission. For all practical purposes he is in command of the force of game wardens and other officers that the Commission has under its jurisdiction.

²² The headquarters of the Eastern rodent control district of the Division of Economic Investigations is also located in this building.

APPENDIX I

OUTLINE OF ORGANIZATION

EXPLANATORY NOTE

The purpose of the Outlines of Organization in this series of Monographs is to show in detail the organization and personnel of the several services of the national government to which they relate. They have been prepared in accordance with the plan followed by the President's Commission on Economy and Efficiency in its outlines of the organization of the United States government.¹ They differ from those outlines, however, in that whereas the Commission's report showed only organization units, the presentation herein has been carried far enough to show the personnel embraced in each organization unit.

These outlines are of value not merely as an effective means of making known the organization of the several services. If kept revised to date, they constitute exceedingly important tools of administration. They permit the directing personnel to see at a glance the organization and personnel at their disposal. They establish definitely the line of administrative authority and enable each employee to know his place in the system. They furnish the essential basis of plans for determining costs by organization division and sub-division. They afford the data for a consideration of the problem of classifying and standardizing personnel and compensation. Collectively they make it possible to determine the number and location of organization units of any particular kind, such as, laboratories, libraries, blue-print rooms, or other plants, to what services attached and where located, or to determine what services are maintaining stations at any city or point in the United States. The Institute hopes that upon the completion of the present series, it will be able to prepare a complete classified statement of the technical and other facilities at the disposal of the government. The present monographs will then furnish the details regarding the organization, equipment, and work of the institution so listed and classified.

¹ 62 Cong., H. doc. 458, 1912, 2 vols.

OUTLINE OF ORGANIZATION
BUREAU OF BIOLOGICAL SURVEY
DEPARTMENT OF AGRICULTURE
JULY 1, 1928

<i>Organization Units;</i>		<i>Annual</i>	
<i>Classes of Employees</i>		<i>Number</i>	<i>Rate</i>
1. General Administration			
1. Office proper of Chief of Bureau			
Chief	I	\$8,000	
Associate Chief	I	6,400	
Assistant to the Chief	I	3,400	
Secretary to Chief	I	2,700	
Secretarial Clerk	I	2,300	
2. Business Operations			
Assistant in Operations, in charge	I	3,400	
Clerk (Part time)	I	1,440	
1. Accounts			
Accountant, in charge	I	3,200	
Auditor	4	2,100	
Bookkeeper	2	2,210	
Stenographer	I	1,860	
2. Property			
Property Clerk, in charge	I	2,500	
Clerk	I	1,500	
3. Mails and Files			
File Clerk, in charge	I	2,000	
File Clerk	I	1,560	
Mail Clerk	I	1,620	
Messenger	2	1,170	
Junior Messenger	I	600	
4. Custodial (Quarters) Service			
Charwoman	3	428	
3. Manuscripts for Publications and for Press and Radio Release			
Editor, in charge	I	3,400	
Editorial Clerk	I	2,400	
Clerk (Part time)	I	1,440	
4. Exhibits, Photographs, and Publication Distribution			
Senior Administrative Assistant, in charge	I	3,600	
Photographer	I	2,300	
Publication Clerk	I	1,860	
Typist and Photographic File Clerk	I	1,620	

2. Division of Biological Investigations

1. Washington Office

Senior Biologist, in charge	I	4,800
Principal Biologist	I	6,400
Senior Biologist	6	4,600
Associate Biologist	I	3,500
Taxidermist	I	2,200
Scientific Aid	2	1,950
Assistant Biological Aid	I	1,680
Stenographer	2	1,830
Typist	I	1,620
Clerk	4	1,620
Messenger	I	1,140

2. Big-Game Investigations, Field Station,
Jackson, Wyoming

Associate Biologist	I	3,300
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3. Investigations of Injurious Animals

1. Field Station, Tucson, Arizona

Senior Biologist	I	4,600
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2. Field Station, Puyallup, Washington

Associate Biologist	I	3,300
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3. Reindeer and Grazing Investigations
in Alaska, Fairbanks

Senior Biologist, in charge	I	5,000
Range Examiner	I	3,600

3. Division of Economic Investigations

1. Washington Office

Principal Biologist, in charge	I	5,600
Senior Biologist	I	4,600
Clerk-Stenographer	I	1,920
Stenographer	I	1,860

2. Field Service (Control of Rodents and
Predatory Animals)1. Eradication Methods Laboratory,
Denver, Colorado

Biologist, in charge	I	3,800
Associate Biologist	I	3,200
Assistant Biologist	I	3,000
Clerk	I	1,980
Skilled Laborer	I	1,260

2. Eastern United States District in
Rodent Control

1. Washington, D. C.

Leader in Rodent Control, in charge	I	3,100
Assistant Biologist Aid	I	1,980
Stenographer	I	1,620

2.	Lafayette, Indiana		
	Junior Biologist	I	2,500
3.	Amherst, Massachusetts		
	Junior Biologist	I	2,100
4.	Raleigh, North Carolina		
	Junior Biologist	I	2,000
3.	Alaska (In Coöperation with Territorial Government); Headquarters, Juneau		
	Leader in Predatory Animal Control	I	2,500
4.	Arizona District; Headquarters, Phoenix		
	Leader in Rodent Control	I	3,100
	Junior Biologist	I	2,400
	Leader in Predatory Animal Control	I	3,100
	Assistant Leader in Predatory Animal Control	I	2,400
	Clerk	I	2,040
5.	California District; Headquarters, Sacramento		
	Leader in Rodent Control	I	2,800
	Junior Biologist	I	2,300
	Leader in Predatory Animal Control	I	2,900
	Assistant Leader in Predatory Animal Control	2	2,000
	Clerk	I	1,920
6.	Colorado District; Headquarters, Denver		
	Leader in Rodent and Predatory Animal Control	I	3,000
	Assistant Biologist (Rodent Control)	I	2,700
	Assistant Leader in Predatory Animal Control	2	2,500
	Clerk	I	2,040
7.	Idaho District; Headquarters, Gooding (pred.) and Boise (rod.)		
	Leader in Rodent Control	I	2,600
	Assistant Biological Aid	I	1,740
	Leader in Predatory Animal Control	I	3,000
	Junior Leader in Predatory Animal Control	I	1,740
8.	Kansas District; Headquarters, Manhattan		
	Leader in Rodent Control	I	3,000
	Assistant Biological Aid	I	1,920
	Clerk	I	1,260

9. Montana District ; Headquarters, Billings (pred.) and Bozeman (rod.)		
Leader in Rodent Control	I	2,800
Junior Biologist	I	2,300
Leader in Predatory Animal Control	I	3,000
Clerk	I	1,560
10. Nevada District ; Headquarters, Reno		
Leader in Rodent and Predatory Animal Control	I	3,200
Junior Biologist (Rodent Control)	I	2,000
Assistant Leader in Predatory Animal Control	I	2,300
Clerk	I	1,800
11. New Mexico District ; Headquarters, Albuquerque		
Leader in Rodent and Predatory Animal Control	I	3,200
Junior Biologist	2	2,100
Clerk	I	1,920
Agent	I	1,800
12. Oregon District ; Headquarters, Portland		
Leader in Rodent Control	I	3,000
Junior Biologist	I	2,300
Agent	I	1,800
Clerk	I	1,860
Leader in Predatory Animal Control	I	3,000
Assistant Leader in Predatory Animal Control	2	2,500
Clerk	I	1,980
13. South Dakota and Nebraska District ; Headquarters, Rapid City		
Leader in Rodent and Predatory Animal Control	I	3,200
Junior Biologist (Rodent Control)	I	2,000
Assistant Leader in Predatory Animal Control	I	2,000
Clerk	I	1,800
14. Texas District ; Headquarters, San Antonio		
Leader in Rodent Control	I	3,000
Junior Biologist	2	2,000
Leader in Predatory Animal Control	I	3,100
Assistant Leader in Predatory Animal Control	2	2,200
Clerk	I	1,980

15.	Utah District; Headquarters, Salt Lake City		
	Leader in Rodent Control	I	2,900
	Junior Biologist	I	2,300
	Leader in Predatory Animal Control	I	3,100
	Assistant Leader in Predatory Animal Control	I	2,500
	Junior Leader in Predatory Animal Control	I	1,800
	Clerk	I	1,500
16.	Washington District; Headquarters, Olympia		
	Leader in Rodent Control	I	3,000
	Junior Biologist	2	2,250
	Leader in Predatory Animal Control	I	3,000
	Junior Leader in Predatory Animal Control	I	1,980
	Clerk	2	1,650
17.	Wyoming District; Headquarters, Cheyenne (pred.) and Laramie (rod.)		
	Leader in Rodent and Predatory Animal Control	I	3,200
	Agent (Rodent Control)	I	2,400
	Agent	I	1,800
	Assistant Leader in Predatory Animal Control	I	2,300
	Junior Leader in Predatory Animal Control	I	1,800
	Clerk	I	2,100
	Agent (Clerk)	I	1,080
4.	Division of Food Habits Research		
1.	Washington Office		
	Senior Biologist, in charge	I	5,000
	Senior Biologist	2	4,700
	Associate Biologist	2	3,400
	Assistant Biologist	2	2,850
	Junior Biologist	2	2,200
	Laboratory Assistant	I	1,380
	Stenographer	I	1,680
2.	Coöperative Quail Investigation, Beatchton, Georgia		
	Field Assistant, in charge	I	4,000
	Field Assistant	I	2,600
5.	Division of Fur Resources		
1.	Washington Office		
	Senior Biologist, in charge	I	4,800
	Senior Biologist	I	4,600
	Clerk-Stenographer	I	1,980
	Senior Typist	I	1,440

2.	U. S. Fur Animal Experiment Station, Saratoga Springs, New York		
	Biologist, in charge	I	3,800
	Junior Animal Husbandman	I	2,000
	Laborer	I	1,320
3.	U. S. Rabbit Experiment Station, Fon- tana, California		
	Biologist, in charge	I	3,800
	Junior Animal Husbandman	I	2,620
	Clerk-Stenographer	I	1,500
4.	Studies of Epizootic Diseases of Fur Animals, St. Paul, Minnesota		
	Agent (Veterinarian)	I	2,400
	Agent (Assistant)	I	1,320
6.	Division of Game and Bird Conservation		
1.	Washington Office		
	U. S. Game Conservation Officer, in charge	I	5,600
	Assistant U. S. Game Conservation Officer	2	4,600
	Senior Biologist	I	4,600
	Administrative Assistant	I	3,100
	Junior Administrative Assistant	2	2,800
	Senior Clerk	I	2,300
	Clerk-Stenographer	I	2,040
	Stenographer	3	1,720
	Junior Clerk	I	1,680
	Assistant Clerk	I	1,620
2.	Big-Game Preserves		
1.	National Bison Range, Montana		
	U. S. Reservation Protector, in charge	I	2,800
2.	Niobrara Reservation, Nebraska		
	U. S. Reservation Protector, in charge	I	2,200
3.	Sullys Hill National Game Preserve, North Dakota		
	U. S. Reservation Protector, in charge	I	2,000
4.	Wind Cave National Game Preserve, South Dakota		
	U. S. Reservation Protector, in charge	I	2,500
5.	Elk Refuge, Wyoming		
	U. S. Reservation Protector, in charge	I	2,400

3. Bird Refuges		
1. Alaska Reservations		
Administrative Officer ¹	I	5,000
2. Big Lake Reservation, Arkansas		
U. S. Reservation Protector, in charge	I	1,680
3. Tampa Bay Group of Refuges, Florida		
Warden, in charge	I	300
4. Blackbeard Island Reservations, Georgia		
Warden (Coöperative), in charge	I	0
Assistant Warden (Coöperative)	2	0
5. Hawaiian Islands Reservation		
Warden, in charge	I	300
6. North Platte Reservation, Nebraska		
Warden (Coöperative), in charge	I	0
7. Carsbad Reservation, New Mexico		
Warden (Coöperative), in charge	I	0
Assistant Warden (Coöperative)	2	0
8. Rio Grande Reservation, New Mexico		
Warden (Coöperative), in charge	I	0
9. Lake Malheur Reservation, Oregon		
U. S. Reservation Protector, in charge	I	1,380
10. Belle Fourche Reservation, South Dakota		
Warden, in charge	I	300
11. Conconully Reservation, Washington		
Warden (Coöperative), in charge	I	0
12. Nine Pipe Bird Reservation (Montana)		
Warden (Coöperative), in charge	I	0
13. Minidoka Bird Reservation (Idaho)		
Warden (Coöperative), in charge	I	0
14. Willow Creek Bird Reservation (Montana)		
Warden (Coöperative), in charge	I	0
15. Pablo Bird Reservation (Montana)		
Warden (Coöperative), in charge	I	0
16. Upper Mississippi River Wild Life and Fish Refuge, Headquarters, Winona, Minnesota		

¹ This officer, as the chief resident representative of the Survey in Alaska, is *ex officio* the executive officer and fiscal agent of the Alaska Game Commission.

Superintendent	I	5,200
Land Valuation Engineer	I	4,600
Attorney	I	3,800
Administrative Assistant	I	2,900
Abstractor	2	2,700
Junior Forester	2	2,200
Transitman	I	2,200
Reservation Ranger	3	1,900
Deputy Reservation Ranger	8	480
Stenographer and Clerk	8	1,567
17. Bear River Migratory Bird Refuge, Utah		
Superintendent	I	3,800
Irrigation Engineer	I	3,800
Assistant Irrigation Engineer	I	2,900
4. Protection of Migratory Birds ^a		
1. United States Game Protector		
1. Mobile, Alabama	I	2,400
2. Little Rock, Arkansas	I	2,500
3. Berkeley, California	I	2,500
4. Daytona Beach, Florida	I	2,400
5. Savannah, Georgia	I	2,500
6. Peoria, Illinois	I	2,600
7. Russellville, Kentucky	I	2,300
8. Portland, Maine	I	2,400
9. St. Paul, Minnesota	I	2,400
10. Kansas City, Missouri	I	2,600
11. St. Louis, Missouri	I	2,600
12. Billings, Montana	I	2,500
13. Omaha, Nebraska	I	2,500
14. Pleasantville, New Jersey	I	2,500
15. Socorro, New Mexico	I	2,400
16. Owego, New York	I	2,600
17. New Bern, North Carolina	I	2,500
18. Columbus, Ohio	I	2,500
19. Portland, Oregon	I	2,500
20. Memphis, Tennessee	I	2,400
21. Houston, Texas	I	2,400
22. ——— Virginia, (Vacant)	I	2,300
23. Spokane, Washington	I	2,500
2. Marine Engineer and Pilot	I	2,200

^aIn addition, there are under appointment between 600 and 700 United States deputy game wardens, at \$3.50 a day, when actually employed, who coöperate in the enforcement of the Migratory Bird Treaty and Lacey Acts.

5. Importation of Foreign Birds and Mammals			
1.	Senior Biologist, in charge	I	4,600
2.	Importation Inspector ³		
			per inspection
1.	Baltimore, Maryland	I	5
2.	Los Angeles, California	I	5
3.	New York, New York	2	5
4.	Philadelphia, Pennsylvania	I	5
5.	San Francisco, California	4	5
7. Alaska Game Commission			
	Alaska Game Commissioners		5 ⁴

The Alaska Game Commission has its own organization of game wardens, deputy game wardens, licensing officers, etc., to administer the Alaska Game Law. At the present time there are eight full-time wardens paid from \$2100 to \$2600 each per annum, with an upper salary limit of \$3000 per annum. The number of deputy wardens varies with the need for their services at different seasons of the year. They are paid on a *per diem* basis, and are appointed either for general work or for duty in some restricted locality. Licensing officers also vary in numbers. They are appointed generally by the executive officer and fiscal agent, and are either paid on the "piece work" basis or serve without salary.

³ In addition there are, as detailed elsewhere, three seasonal Quail Inspectors on the Mexican border.

⁴ Four of these Commissioners are resident Alaskans not in federal employ—one from each of Alaska's four judicial districts. They are paid \$10 per day for time actually spent in attending session of the Commission, together with an allowance for travel and subsistence. The fifth Commissioner is the principal Biological Survey representative in Alaska and is paid no salary for his commission work.

APPENDIX 2

CLASSIFICATION OF ACTIVITIES

EXPLANATORY NOTE

The Classifications of Activities in this series have for their purpose to list and classify in all practicable detail the specific activities engaged in by the several services of the national government. Such statements are of value from a number of standpoints. They furnish, in the first place, the most effective showing that can be made in brief compass of the character of work performed by the service to which they relate. Secondly, they lay the basis for a system of accounting and reporting that will permit the showing of total expenditures classified according to activities. Finally, taken collectively, they make possible the preparation of a general or consolidated statement of the activities of the government as a whole. Such a statement will reveal in detail, not only what the government is doing, but the services in which the work is being performed. It is hardly necessary to point out the value of such information in planning for future work and in considering the problem of the better distribution and coördination of the work of the government. The Institute contemplates attempting such a general listing and classification of the activities of the government upon the completion of the present series.

CLASSIFICATION OF ACTIVITIES

- I. Investigation and Research
 1. Study of Life Habits of Wild Animals
 2. Classification of Wild Animals
 3. Studies in Geographic Distribution of Wild Animals and Plants
 4. Life Zone Investigations of Definite Areas
 5. Biological Surveys of Definite Areas
 6. Special Big Game Investigations

7. Investigations for Improvement of Reindeer in Alaska
8. Investigations at Reindeer Experiment Station
9. Investigations of Problems of Fur Farmers
10. Studies in Fur Animal Disease and Parasites
11. Investigations of Problems of Rabbit Raisers
12. Studies of Rabbit Diseases, etc.
13. Investigations in Animal Poisons
14. Studies in Bird Migration
15. Bird Censuses (General)
16. Wild Fowl Censuses
17. Bird Banding
18. Food Habits Studies by Laboratory Examinations of Stomach Contents of Birds, Mammals, Reptiles, and Amphibians
19. Studies in Game Bird Propagation
20. Specific Studies in Covert Restocking
21. Surveys of Food Resources for Waterfowl
22. Investigations and Experiments in Predatory Animal Control
23. Investigations and Experiments in Control of Injurious Rodents
24. Investigations and Experiments in Control of Other Animal Pests
25. Investigations and Experiments in Control of Bird Pests
2. Encouragement of Useful Forms of Wild Life
 1. Advice on Game Bird and Animal Propagation Methods
 2. Devising of Methods for Attracting Birds about Parks, Homes, etc.
 3. Encouragement of Conservation of Wild Fur Bearers
 4. Advice on Small Animal Production (For Pets and Laboratory Use)
 5. Maintenance and Protection of Game Preserves and Bird Refuges
 6. Restocking of Reservations
 7. Disposal of Surplus Animals on Reservations
 8. Issuance of Permits for Fur Farming on Certain Alaska Islands
 9. Administration of Upper Mississippi Wild Life and Fish Refuge Act

10. Administration of Act Protecting Wild Life on Reservations
3. Repression of Undesirable Forms of Wild Life
 1. Killing of Predatory Animals
 2. Leadership and Demonstration in Coöperative Effort Against Predatory Animals
 3. Leadership and Demonstration in Coöperative Effort Against Injurious Rodents
 4. Leadership and Demonstration in Coöperative Effort Against Other Animal Pests and Injurious Birds
 5. Processing of Poisons and Food Stuffs for Use Against Predatory and Noxious Animals
4. Protection of Wild Life
 1. Administration of Migratory Bird Treaty and Lacey Acts by Warden Service and in Coöperation with State Law Enforcement Agencies
 2. Issuance of Permits for Game Propagation
 3. Regulation of Importation of Wild Birds and Animals
 4. Preparation of Regulations Under Alaska Game Law
5. Dissemination of Information
 1. Preparation and Editing of Publications
 2. Preparation of Exhibits and Photographs
 3. Answering of Inquiries
 4. Addresses by Officers (Conventions, universities, etc.)
6. Miscellaneous
 1. Regulation of Grazing of Domestic Stock in Certain Alaskan Islands

APPENDIX 3

PUBLICATIONS

The present-day publications of the Biological Survey, consist of the reports, bulletins, circulars, etc., included in the general publications common to the several bureaus of the Department of Agriculture; and, in addition those special publications made necessary by the unique nature of the activities that the Survey performs.

First to be noted among these general publications are: (a) Farmers' Bulletins; (b) Technical Bulletins; (c) Statistical Bulletins; (d) Circulars; (e) Leaflets; and, (f) Miscellaneous Publications. The names of the first five of these will be sufficiently descriptive of their nature if there be added the statement that Farmers' Bulletins and Leaflets are prepared in a popular or non-technical style compared to the technical bulletins. The latter were, until quite recently called Department Bulletins, just as the Circulars were known as Department Circulars the changes being made in the interest of greater clearness and definiteness. The designation "Department Bulletin," in particular, had long been a source of confusion, because, although departmental administrative regulations prescribed that they should be used for technical material only, they were frequently obtained by the public in the belief that they were of a popular character.¹

The new Circulars are less technical than the new Bulletins, but not enough less to be styled popular. They are designed for the supplying of general information to limited mailing lists of a scientific character. The Leaflets are entirely popular in treatment and very concise, never exceeding eight pages in length. They,

¹ Quite recently even the Farmers' Bulletins, which have always been intended to be of a popular, non-technical nature, have been criticized on the ground of too much learned talk in their insides. This impelled the Assistant Secretary of Agriculture to declare, in an address entitled "Agricultural Bulletins from the Farmer's Viewpoint," that "even the educated farmer does not care for a highly scientific discussion of the genus, species, and family relations of the insect that is destroying his crops, but he does want to know how he is going to get rid of that insect and save his crops."

like all the other publications of a general type described above, save the Miscellaneous Publications, are of octavo size. Usually, all are illustrated with cuts, diagrams, etc.

The Miscellaneous Publications, which were formerly known as Miscellaneous Circulars, comprise publications of a miscellaneous nature not falling within any of the classes hereinbefore described, or, if falling within the same, of other than the regular octavo size.²

Occasionally, contributions of the members of the Survey staff to the fundamental sciences, when of a highly technical nature, are published in the departmental semi-monthly known as the *Journal of Agricultural Research*.

Other publications of the Survey of a general nature similar to publications of other bureaus of the Department of Agriculture include the annual reports, Yearbook Separates, Service and Regulatory Announcements, and office and special circulars. The Annual Report of the Chief of the Survey is an account of the work performed and results accomplished during the preceding fiscal year. The manuscripts for these reports are submitted to the Secretary by September 1 of each year, and are usually released for general distribution early in December. Like the bulletins, circulars, etc., they are of octavo size, and are commonly around thirty pages in length. They are not illustrated, but occasionally contain simple statistical tables. The edition is limited by law to twenty-five hundred copies. The Yearbook Separates are articles on various phases of the Survey's work presented in a popular style, with illustrations. Until 1926 they usually were from ten to twenty pages long. They were then shortened to the present length of one to two pages. First published as parts of the Yearbooks of the Department, they are later issued as separates in pamphlet form exactly as they have appeared in the Yearbooks, usually retaining the original pagination. The Service and Regulatory Announcements are just about

² Administrative Regulations (Paragraph 581 (f)), as amended by memorandum of the Secretary of Agriculture of August 13, 1927, prescribe that manuscripts for publication in the Farmers' Bulletin, Technical Bulletin, Statistical Bulletin, Circular, or Leaflet series will not be approved for publication in any other than the regular octavo size "except in most unusual cases, and then only as approved by the director of information." When so published they will bear a number of the Miscellaneous Publication series. An example of a Survey Miscellaneous publication is the annual *Directory of Officials and Organizations Concerned with the Protection of Birds and Game*.

what the title indicates. Such things as the regulations under the Migratory Bird Treaty Act and the regulations for the administration of the Upper Mississippi Wild Life and Fish Refuge are published in this format—simply octavo size pamphlets of from one or two to about a dozen pages.³ Office circulars and special circulars are sometimes printed but are usually mimeographed. They deal with matters of administration⁴ or with informational material for which a wide and easy distribution is desired. Examples of such publications in printed form are, "Hints on the Care of Peltries," "Hints on Raising Squirrels," and various directions for the combating of rats and other farm pests. Usually they are one-sheet affairs of the type popularly known as dodgers or handbills,⁵ although sometimes of more ambitious size, as in the case of the 15-page mimeographed "Poisonous Snakes of the United States." A poster (15 × 36 in.) for wall display showing the open seasons for game is also published annually in printed form.

A great deal of mimeographed information is disseminated by the Survey. Generally this information is in the nature of listings of various sorts—lists of publications, game refuges, etc. Sometimes, however, important special reports are mimeographed, one recent instance being the 17-page report of the Chief of the Survey upon "Our Vanishing Wildfowl and Present Conditions Affecting Their Abundance"; another, a report upon investigations made of the effect of rodent poisons upon game birds.⁶

Some of the best-known and most widely-distributed mimeographed publications have been those got out during the past few years in furtherance of the fox-farming and rabbit-breeding industries. A list of the fur farms of Alaska was published in 1924; one of the fox breeders of the Continental United States in the following year. Similar publications dealing with rabbit raising have been published since then. It is not likely that other lists

³ The circulars of the Alaska Game Commission are also published in this format, but are no longer classed as Service and Regulatory Announcements.

⁴ An example is the "Memorandum for Field Men of the Biological Survey Regarding Practices and Policies in Matters of Bird Control," published October 26, 1927, in mimeographed form.

⁵ An important recent example of this type is the "Guide for Taking Censuses of Waterfowl."

⁶ This was published in July, 1927; the wildfowl report in March, 1926.

of the sort will be produced, it being felt that the industries in question are now strong enough to do this work for themselves through their national associations.

Similarly to be noted among the mimeographed publications, is one not designed for general circulation. This is "The Survey," the Bureau magazine, which has appeared at monthly intervals since January 1, 1920. Though purely of the house organ class as to direct purpose, being designed as a means for keeping the individual members of the personnel in Washington and in the field informed regarding the progress of all phases of the work of the organization its files are of no little value to the student; constituting, for the period covered since its beginning, an important source of the history of the development of American governmental wild life control.⁷

At the present time the Survey is preparing for publication the immense mass of material accumulated in the investigation into the food habits of the English sparrow, hitherto alluded to. It has just published an extensive manuscript on the history of introduced and transplanted birds in the United States,⁸ and is about to publish a briefer one on game birds suitable for introduction.

The outstanding special publications of the Survey are, of course, included in the continuing series known as North American Fauna, the beginning of the publication of which series and the influences combining to inaugurate it have been gone into hitherto. Since No. 1 was brought out in 1889, some forty-eight additional numbers have been published.⁹ They are highly scientific and technical in treatment and represent the fruits of an immense amount of research into the wild life of the North American continent from the Arctic to the tropics. They are illustrated with plates, distribution maps—which are occasionally in colors—etc.; and are

⁷ The same might be said of the files of the weekly publication of the Department of Agriculture known as *The Official Record*, since January 4, 1922, and between that date and April 14, 1915, as the *Weekly News Letter*. This publication prints news of the outstanding activities of all bureaus of the Department and naturally runs many items about the work of the Survey. Between May 10 and December 10, 1915, a monthly publication known as *The Departmental Circular* was also published by the Department of Agriculture along similar lines.

⁸ Technical Bulletin No. 61; April, 1928.

⁹ The most recent "Fauna" is numbered 51. Nos. 6 and 9 were never published.

furnished with bibliographies. They vary greatly in size—from about forty-eight pages up into the hundreds. The earlier numbers are out of print. The later ones can be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., for from ten cents to \$1.25, depending upon the size of the volume.

Since 1890 twenty-two life zone maps have been prepared by the Survey, the most recent one being that of the Mount Rainier National Park in 1927. Four have been of North America as a whole, one of the United States and adjacent areas; the remainder of smaller particular areas, generally in the United States, occasionally in Canada or Mexico. One of Panama was published in 1920. Seventeen of these maps have been published by the Survey itself, generally to illustrate certain numbers of the North American Fauna series. Others have been published coöperatively with other organizations. A few have been published by the other organizations alone. Thus, the most recent one, of Mount Rainier Park, is published in a Park Service Bulletin. The Panama map was published by the Smithsonian Institution.

This matter of the publication by other organizations, governmental or otherwise, either independently or in coöperation with the Survey, of the results of work done by members of the Survey's staff suggests a point important to be made clear before bringing this brief notice to a close. This book can be concerned directly, of course, only with the things the Survey does of and by itself as a governmental organization. The concern of the Survey with things done by others with its assistance, or through the instrumentality of its officers, may legitimately be very great; but the chronicler of the Survey, however great the temptation may be, must restrain very strictly any tendency to get off into by-paths and wander afield. Were he to undertake to explore all the ramifications represented by the extra-Survey wild life work of the members of the Survey's staff, past and present, he would be letting himself in for the preparation of a book conservatively to be described as formidable.

So as regards the publication by non-federal governmental agencies, or by other bureaus or departments of the national government itself, or by organizations of a non-governmental description, of manuscripts upon wild life subjects prepared by members

of the Survey's staff, the writer can do little more than say that such publications have been made in the past and are being made to-day. It is highly important, however, to point out that the total of wild life information compiled and prepared by the staff of the Survey, from the time of the Survey's beginning, for extra-Survey publication, has been very great; and that the volume of similar information, similarly prepared and published, that is regularly reaching the reading public to-day is far from being inconsiderable.

In a statement made within recent months in the *United States Daily*, covering the work of the Survey, the Editor of the Bureau's publications said:

For more than forty years the Biological Survey, under its different titles, has been publishing the results of its investigations. For more than a quarter of a century this was through the medium of its own bulletins, circulars, and other reports, including the series known as the "North American Fauna," and in the Department's farmers' bulletins and yearbooks, and more recently in the Departmental series of bulletins, circulars, and leaflets, and the "Journal of Agricultural Research." Much information is also prepared every year by specialists for outside publication, in the form of books and articles in scientific and popular periodicals.

The function of the Biological Survey with regard to furnishing information on the habits of wild animals is to present the facts unbiased and without "nature faking." So consistently has this policy been followed that its publications are sought by scientific libraries in this country and abroad.

The following is a complete list of the Survey's publications from 1886 to 1928.

LIST OF PUBLICATIONS OF THE BIOLOGICAL SURVEY¹⁹

The publications of the United States Department of Agriculture contributed by the Bureau of Biological Survey are outgrowths of the series of reports, bulletins, and circulars prepared in this branch of the department from the first years of its establishment and under the following designations: Branch of Economic Ornithology of the Division of Entomology (1885-1886), Division of Economic Ornithology and Mammalogy (1886-1896), Division of Biological Survey (1896-1905), and Bureau of Biological Survey (1905-). These publications have appeared in no less than twenty bureau and departmental series, forerunners of the present series of:

¹⁹ Compiled in the Editorial Office, Bureau of Biological Survey, under the direction of Wm. H. Cheesman, editor.

1. Technical Bulletins
2. The North American Fauna
3. Circulars, including Circulars of the Alaska Game Commission
4. Miscellaneous Publications.
5. Farmers' Bulletins.
6. Leaflets.
7. Annual Reports of the Biological Survey
8. Yearbook of Agriculture
9. Journal of Agricultural Research
10. Service and Regulatory Announcements of the Biological Survey
11. Posters, Open Seasons for Game and Miscellaneous

In the series listed on the following pages, the code letters following the numbers in the various related groups indicate the bureau or departmental series in which the publications were issued. An asterisk (*) preceding any number indicates that that publication is out of print.

In addition to the above, numerous mimeographed leaflets (Series Bi-) are issued from time to time to supply pressing needs in advance of revised or more extended formal publication. Titles of current numbers are included in mimeographed lists of "Publications of the Bureau of Biological Survey Available for General Distribution" (Bi-161), copies of which, revised to date, are obtainable on request. Publications for which a price is given are for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., but not by the Department.

TECHNICAL BULLETINS ¹¹

Biological Survey Bulletin Series

No.

- *1-BS. The English sparrow (*Passer domesticus*) in North America, especially in its relations to agriculture. By Walter B. Barrows. 405 p., illus. 1889.
- *2-BS. Report on bird migration in the Mississippi Valley in the years 1884 and 1885. By W. W. Cooke. 313 p., illus. 1888.
- *3-BS. The hawks and owls of the United States in their relation to agriculture. By A. K. Fisher. 210 p., illus. 1893.
- *4-BS. The prairie ground squirrels, or spermophiles, of the Mississippi Valley. By Vernon Bailey. 69 p., illus. 1893.
- *5-BS. The pocket gophers of the United States. By Vernon Bailey. 47 p., illus. 1895.
- *6-BS. The common crow of the United States: General report, by Walter B. Barrows; Report on insect food, by E. A. Schwarz. 98 p., illus. 1895.
- *7-BS. Preliminary report on the food of woodpeckers. By F. E. L. Beal. The tongues of woodpeckers. By F. A. Lucas. 44 p., illus. 1895.
- *8-BS. The jack rabbits of the United States. By T. S. Palmer. 84 p., illus. 1896. Revised, 1897.

¹¹ BS, Biological Survey Bulletin series, including contributions of the Division of Economic Ornithology and Mammalogy (1889-1913); D, Department Bulletin series (1913-1927); T, Technical Bulletin series (1927-).

- *9-BS. Cuckoos and shrikes in their relation to agricultur: The food of cuckoos, by F. E. L. Beal; The food of shrikes, by Sylvester D. Judd. 26 p., illus. 1898.
- *10-BS. Life zones and crop zones of the United States. By C. Hart Merriam. 79 p., illus. 1898.
- *11-BS. The geographic distribution of cereals in North America. By C. S. Plumb. 24 p., illus. 1898.
- *12-BS. Legislation for the protection of birds other than game birds. By T. S. Palmer. 94 p., illus. 1900. Revised, 143 p., illus. 1902.
- *13-BS. Food of the bobolink, blackbirds, and grackles. By F. E. L. Beal. 77 p., illus. 1900.
- *14-BS. Laws regulating the transportation and sale of game. By T. S. Palmer and H. W. Olds. 89 p., illus. 1900.
- *15-BS. The relation of sparrows to agriculture. By Sylvester D. Judd. 98 p., illus. 1901.
- *16-BS. Digest of game laws for 1901. By T. S. Palmer and H. W. Olds. 152 p., illus. 1901.
- *17-BS. Birds of a Maryland farm: A local study of economic ornithology. By Sylvester D. Judd. 116 p., illus. 1902.
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 *8-N. Monographic revision of the pocket gophers, family Geomyidae (exclusive of the species of *Thomomys*). By C. Hart Merriam. 258 p., illus. 1895.
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- *85-BSC. Annual report of the governor of Alaska on the Alaska game law, 1911. By Walter E. Clark. 12 p. 1912.
- *86-BSC. Regulation for the protection of deer in Alaska. 1 p. 1912.
- *87-BSC. National reservations for the protection of wild life. By T. S. Palmer. 32 p., illus. 1912.
- *88-BSC. Directory of officials and organizations concerned with protection of birds and game, 1912. By T. S. Palmer. 16 p. 1912.
- *89-BSC. Directory of officials and organizations concerned with protection of game in Alaska, 1912. 2 p. 1912.
- *90-BSC. Annual report of the governor of Alaska on the Alaska game law, 1912. By Walter E. Clark. 14 p. 1913.
- 91-BSC. Not issued.
- *92-BSC. Proposed regulations for the protection of migratory birds. 6 p. 1913.
- *93-BSC. Explanation of the proposed regulations for the protection of migratory birds. By T. S. Palmer. 5 p. 1913.
- *94-BSC. Directory of officials and organizations concerned with protection of birds and game, 1913. By T. S. Palmer. 16 p. 1913.
- *(a-BSC). Report of the governor of Alaska on the Alaska game law. By J. F. A. Strong. 14 p. 1913.
- *(b-BSC). Explanation of the proposed changes in the regulations for the protection of migratory birds. 2 p. 1914.
- *(c-BSC). Directory of officials and organizations concerned with the protection of birds and game, 1914. By T. S. Palmer. 16 p. 1914.
- *(d-BSC). Report of the governor of Alaska on the Alaska game law. By J. F. A. Strong. 16 p. 1914.
- *(e-BSC). List of publications of the Biological Survey available for general distribution. 3 p. 1915.
- *(f-BSC). Report of the governor of Alaska on the Alaska game law, 1915. By J. F. A. Strong. 18 p. 1915.
- *———. Directions for field work of assistants of the Biological Survey. (Form No. 69.) By Vernon Bailey. 10 p., illus. 1912.

Biological Survey Document Series

No.

- *101-BSD. Directory of officials and organizations concerned with the protection of birds and game, 1915. By T. S. Palmer. 16 p. 1915.
- *102-BSD. Directions for preparing specimens of large mammals in the field. 4 p., illus. 1915.
- *103-BSD. Instructions for taking bird census, 1916. 3 p. 1916.
- *104-BSD. Directory of officials and organizations concerned with the protection of birds and game, 1916. By T. S. Palmer. 16 p. 1916.
- *105-BSD. Annual report of the governor of Alaska on the Alaska game law, 1916. By J. F. A. Strong. 16 p. 1917.
- *106-BSD. Instructions for making bird count, 1917. 2 p. 1917.
- *107-BSD. Shipment of game—Federal laws. 2 p. 1917.
- *108-BSD. Directory of officials and organizations concerned with the protection of birds and game, 1917. By W. F. Bancroft. 17 p. 1917.
- *109-BSD. Directory of officials and organizations concerned with the protection of birds and game, 1918. By W. F. Bancroft. 17 p. 1918.
- *110-BSD. Annual report of the governor of Alaska on the Alaska game law, 1918. By Thomas Riggs, Jr. 14 p. 1919.

Department Circular Series

No.

- *51-DC. Our national elk herds. By Henry S. Graves and E. W. Nelson. 34 p., illus. 1919.
- *59-DC. Suggestions for field studies of mammalian life-histories. By Walter P. Taylor. 8 p. 1919.
- *63-DC. Directory of officials and organizations concerned with the protection of birds and game, 1919. By Geo. A. Lawyer. 18 p. 1919.
- *88-DC. Annual report of the governor of Alaska on the Alaska game law, 1919. By Thomas Riggs, Jr. 18 p. 1920.
- *131-DC. Directory of officials and organizations concerned with the protection of birds and game, 1920. By Geo. A. Lawyer. 19 p. 1920.
- *135-DC. Maintenance of the fur supply. By Ned Dearborn. 12 p., illus. 1920.
- *168-DC. Annual report of the governor of Alaska on the Alaska game law, 1920. By Thomas Riggs, Jr. 18 p. 1921.
- *170-DC. Instructions for bird banding. By Frederick C. Lincoln. 19 p. 1921. (Superseded by Miscellaneous Circular No. 18.)
- *196-DC. Directory of officials and organizations concerned with the protection of birds and game, 1921. By Geo. A. Lawyer and Frank L. Earnshaw. 20 p. 1921.
- *225-DC. Annual report of the governor of Alaska on the Alaska game law, 1921. By Scott C. Bone. 7 p. 1922.
- *242-DC. Directory of officials and organizations concerned with the protection of birds and game, 1922. By George A. Lawyer and Frank L. Earnshaw. 20 p. 1922.

- *260-DC. Annual report of the governor of Alaska on the Alaska game law, 1922. By Scott C. Bone. 7 p. 1923.
- 261-DC. The purpose of bird censuses and how to take them. By May Thacher Cooke. 4 p. 1923. Price, 5 cents.
- *298-DC. Directory of officials and organizations concerned with the protection of birds and game, 1923. By George A. Lawyer and Frank L. Earnshaw. 16 p. 1923.
- *328-DC. Directory of officials and organizations concerned with the protection of birds and game, 1924. By George A. Lawyer and Talbott Denmead. 16 p. 1924.
- 336-DC. Spread of the European starling in North America. By May Thacher Cooke. 8 p., illus. 1925. Price, 5 cents.
- *360-DC. Directory of officials and organizations concerned with the protection of birds and game, 1925. By Talbott Denmead and Frank L. Earnshaw. 12 p. 1925.
- *362-DC. Trapping ducks for banding. By Frederick C. Lincoln. 20 p., illus. 1926.
- *398-DC. Directory of officials and organizations concerned with the protection of birds and game, 1926. 12 p. 1926.

Circulars, Departmental Series

No.

- 40-C. The spread of the European starling in North America to 1928. By May Thacher Cooke, illus. 1928. (In press.)

Alaska Game Commission Circular Series

No.

- *[1-A]. (S. R. A.-A. G. C. 1.) Alaska game law and regulations and Federal laws relating to game and birds in the territory. 24 p., illus. 1925.
- *2-A. Laws and regulations relating to game, land fur-bearing animals, and birds in Alaska. 32 p., illus. 1926.
- *3-A. Laws and regulations relating to game, land fur-bearing animals, and birds in Alaska. 29 p., illus. 1927.
- *4-A. Amendments to the regulations respecting game animals, land fur-bearing animals, game birds, non-game birds, and nests and eggs of birds in Alaska. 4 p. 1928.
- 5-A. Laws and regulations relating to game, land fur-bearing animals, and birds in Alaska, 1928-29. 30 p., illus. 1928. Price, 5 cents.

MISCELLANEOUS PUBLICATIONS ¹⁴

Miscellaneous Circular Series

No.

- 13-MC. Local names of migratory game birds. By W. L. McAtee. 95 p., illus. 1923. Price, 25 cents.

¹⁴ MC, Miscellaneous Circular series (1923-1926); M, Miscellaneous Publication series (1927-).

236 THE BUREAU OF BIOLOGICAL SURVEY

- 18-MC. Instructions for banding birds. By Frederick C. Lincoln. 28 p., illus. 1924. Price, 10 cents.
 69-MC. Construction and operation of Biological Survey Beaver trap. By Vernon Bailey. 4 p., illus. 1926. Revised, 1926. Price, 5 cents.

Miscellaneous Publication Series

- No.
 6-M. Directory of officials and organizations concerned with the protection of birds and game: 1927. Compiled by Talbott Denmead. 12 p. 1927. Price, 5 cents.
 30-M. Directory of officials and organizations concerned with the protection of birds and game: 1928. Compiled by Talbott Denmead and Frank G. Grimes. 12 p. 1928.

FARMERS' BULLETINS¹⁵

- No.
 *54-F. Some common birds in their relation to agriculture. By F. E. L. Beal. 40 p., illus. 1897. Revised, 1898; 48 p., 1904. (Superseded by Farmers' Bulletin No. 630.)
 *160-F. Game laws for 1902. A summary of the provisions relating to seasons, shipment, sale, and licenses. By T. S. Palmer and H. W. Olds. 56 p., illus. 1902.
 *180-F. Game laws for 1903. By T. S. Palmer, Henry Oldys, and R. W. Williams, Jr. 56 p., illus. 1903.
 197-F. Importation of game birds and eggs for propagation. By T. S. Palmer and Henry Oldys. 30 p., illus. 1904. Price, 5 cents.
 *207-F. Game laws for 1904. By T. S. Palmer, Henry Oldys, and R. W. Williams, Jr. 64 p., illus. 1904.
 *226-F. Relation of coyotes to stock raising in the West. By David E. Lantz. 24 p., illus. 1905.
 *230-F. Game laws for 1905. By T. S. Palmer, Henry Oldys, and R. W. Williams, Jr. 54 p., illus. 1905.
 *265-F. Game laws for 1906. By T. S. Palmer and R. W. Williams, Jr. 54 p., illus. 1908.
 *297-F. Methods of destroying rats. By David E. Lantz. 8 p., illus. 1907. (Superseded by Farmers' Bulletin No. 369.)
 *308-F. Game laws for 1907. By T. S. Palmer, Henry Oldys, and Chas. E. Brewster. 52 p., illus. 1907.
 *328-F. Silver fox farming. By Wilfred H. Osgood. 22 p., illus. 1908. (Superseded by Farmers' Bulletin No. 795.)
 330-F. Deer farming in the United States. By David E. Lantz. 20 p., illus. 1908. Price, 5 cents.
 *335-F. Harmful and beneficial mammals of the arid interior, with special reference to the Carson and Humboldt Valleys, Nevada. By Vernon Bailey. 31 p., illus. 1908.
 *336-F. Game laws for 1908. By T. S. Palmer and Henry Oldys. 55 p., illus. 1908. Revised, 1908.
 *352-F. The Nevada mouse plague of 1907-8. By Stanley E. Piper. 23 p., illus. 1909.

¹⁵ 1877—.

- *369-F. How to destroy rats. By David E. Lantz. 20 p., illus. 1909. (Superseded by Farmers' Bulletin No. 896.)
- *376-F. Game laws for 1909. By T. S. Palmer, Henry Oldys, and C. E. Brewster. 56 p., illus. 1909.
- *383-F. How to destroy English sparrows. By Ned Dearborn. 11 p., illus. 1910. (Superseded by Farmers' Bulletin No. 493.)
- *390-F. Pheasant raising in the United States. By Henry Oldys. 40 p., illus. 1910.
- *396-F. The muskrat. By David E. Lantz. 38 p., illus. 1910. (Superseded by Farmers' Bulletin No. 869.)
- *418-F. Game laws for 1910. By Henry Oldys, C. E. Brewster, and Frank L. Earnshaw. 47 p., illus. 1910.
- *456-F. Our grosbeaks and their value to agriculture. By W. L. McAtee. 14 p., illus. 1911.
- *470-F. Game laws for 1911. By Henry Oldys, C. E. Brewster, and Frank L. Earnshaw. 52 p., illus. 1911.
- *484-F. Some common mammals of western Montana in relation to agriculture and spotted fever. By Clarence Birdseye. 46 p., illus. 1912.
- 493-F. The English sparrow as a pest. By Ned Dearborn. 24 p., illus. 1912. Revised, 1917. Price, 5 cents.
- *496-F. Raising Belgian hares and other rabbits. By David E. Lantz. 16 p., illus. 1912. Revised, 1917. (Superseded by Farmers' Bulletin No. 1090.)
- 497-F. Some common game, aquatic, and rapacious birds in relation to man. By W. L. McAtee and F. E. L. Beal. 30 p., illus. 1912. Revised, 1917, 1924. Price, 5 cents.
- 506-F. Food of some well-known birds of forest, farm, and garden. By F. E. L. Beal and W. L. McAtee. 35 p., illus. 1912. Revised, 1918, 1922. Price, 5 cents.
- *510-F. Game laws for 1912. By T. S. Palmer, C. E. Brewster, and Frank L. Earnshaw. 48 p., illus. 1912.
- 513-F. Fifty common birds of farm and orchard. Prepared under the direction of Henry W. Henshaw. 31 p., illus. 1913. Price, 25 cents.
- 525-F. Raising guinea pigs. By David E. Lantz. 12 p., illus. 1913. Revised, 1918, 1921. Price, 5 cents.
- 583-F. The common mole of the Eastern United States. By Theo. H. Scheffer. 10 p., illus. 1914. Revised, 1917. Price, 5 cents. (Superseded by Farmers' Bulletin No. 1247.)
- 587-F. Economic value of North American skunks. By D. E. Lantz. 22 p., illus. 1914. Revised, 24 p., 1917, 1923.
- *609-F. Bird houses and how to build them. By Ned Dearborn. 19 p., illus. 1914. Revised, 1918, 1923. (Superseded by Farmers' Bulletin No. 1456.)
- 621-F. How to attract birds in Northeastern United States. By W. L. McAtee. 15 p., illus. 1914. Revised, 1917, 1921, 1925. Price, 5 cents.
- *628-F. Game laws for 1914. By T. S. Palmer, W. F. Bancroft, and Frank L. Earnshaw. 54 p., illus. 1914.
- 630-F. Some common birds useful to the farmer. By F. E. L. Beal (with contributions by W. L. McAtee and E. R. Kalmbach). 27 p., illus. 1915. Revised, 31 p., 1918; 30 p., 1923; 29 p., 1926. Price, 5 cents.

- *670-F. Field mice as farm and orchard pests. By D. E. Lantz. 10 p., illus. 1915. Revised, 1918. (Superseded by Farmers' Bulletin No. 1397.)
- *692-F. Game laws for 1915. By T. S. Palmer, W. F. Bancroft, and Frank L. Earnshaw. 64 p., illus. 1915.
- 702-F. Cottontail rabbits in relation to trees and farm crops. By D. E. Lantz. 12 p., illus. 1916. Revised, 1922, 1924. Price, 5 cents.
- *706-F. Laws relating to fur-bearing animals, 1915. By D. E. Lantz. 24 p. 1916.
- 755-F. Common birds of Southeastern United States in relation to agriculture. By F. E. L. Beal, W. L. McAtee, and E. R. Kalmbach. 40 p., illus. 1916. Revised, 1918, 1923, 1926, 1927. Price, 5 cents.
- 760-F. How to attract birds in Northwestern United States. By W. L. McAtee. 12 p., illus. 1916. Revised, 1918, 1924. Price, 5 cents.
- *770-F. Canaries: Their care and management. By Alexander Wetmore. 20 p., illus. 1916. (Superseded by Farmers' Bulletin No. 1327.)
- *774-F. Game laws for 1916. By T. S. Palmer, W. F. Bancroft, and Frank L. Earnshaw. 64 p., illus. 1916.
- *783-F. Laws relating to fur-bearing animals, 1916. By D. E. Lantz. 28 p. 1916.
- *795-F. The domesticated silver fox. By Ned Dearborn. 32 p., illus. 1917. (Superseded by Department Bulletin No. 1151.)
- *832-F. Trapping moles. By Theo. H. Scheffer. 14 p., illus. 1917. (Superseded by Farmers' Bulletin No. 1247.)
- 844-F. How to attract birds in the Middle Atlantic States. By W. L. McAtee. 16 p., illus. 1917. Revised, 1922, 1924, 1926. Price, 5 cents.
- 869-F. The muskrat as a fur bearer, with notes on its use as food. By David E. Lantz. 23 p., illus. 1917. Revised, 1923. Price, 5 cents.
- *896-F. House rats and mice. By D. E. Lantz. 24 p., illus. 1917. (Superseded by Farmers' Bulletin No. 1302.)
- *910-F. Game laws for 1917. By George A. Lawyer, W. F. Bancroft, and F. L. Earnshaw. 70 p. 1917.
- *911-F. Laws relating to fur-bearing animals, 1917. By David E. Lantz. 32 p. 1917.
- 912-F. How to attract birds in the East Central States. By W. L. McAtee. 13 p., illus. 1918. Revised, 1922, 1924, 1926. Price, 5 cents.
- *932-F. Rodent pests of the farm. By David E. Lantz. 23 p., illus. 1918.
- *1010-F. Game laws for 1918. By George A. Lawyer and Frank L. Earnshaw. 70 p. 1918.
- *1022-F. Laws relating to fur-bearing animals, 1918. By David E. Lantz. 32 p. 1918.
- *1077-F. Game laws for 1919. By George A. Lawyer and Frank L. Earnshaw. 80 p. 1919.
- *1079-F. Laws relating to fur-bearing animals, 1919. By George A. Lawyer, Frank L. Earnshaw, and Ned Dearborn. 32 p. 1919.
- 1090-F. Rabbit raising. By Ned Dearborn. 35 p., illus. 1920. Price, 5 cents. (Superseded by Leaflet No. 4.)
- 1102-F. The crow in its relation to agriculture. By E. R. Kalmbach. 20 p., illus. 1920. Price, 5 cents.
- *1138-F. Game laws for 1920. By George A. Lawyer and Frank L. Earnshaw. 84 p. 1920.

- *1165-F. Laws relating to fur-bearing animals, 1920. By George A. Lawyer, Frank L. Earnshaw, and Ned Dearborn. 32 p. 1920.
- *1235-F. Game laws for 1921. By Geo. A. Lawyer and Frank L. Earnshaw. 80 p. 1921.
- *1238-F. Laws relating to fur-bearing animals, 1921. By George A. Lawyer and Frank L. Earnshaw. 31 p. 1921.
- 1239-F. Community bird refuges. By W. L. McAtee. 13 p., illus. 1921. Revised, 1922; 16 p., 1923. Price, 5 cents.
- 1247-F. American moles as agricultural pests and as fur producers. By T. H. Scheffer. 23 p., illus. 1922. Revised, 24 p., 1923; 21 p., 1927. Price, 5 cents.
- *1288-F. Game laws for 1922. By Geo. A. Lawyer and Frank L. Earnshaw. 80 p. 1922.
- *1293-F. Laws relating to fur animals, 1922. By George A. Lawyer and Frank L. Earnshaw. 30 p. 1922.
- *1302-F. How to get rid of rats. By James Silver. 14 p., illus. 1923. (Superseded by Farmers' Bulletin No. 1533.)
- 1327-F. Canaries: Their care and management. By Alexander Wetmore. 22 p., illus. 1923. Revised, 1924. Price, 5 cents.
- *1375-F. Game laws for the season 1923-24. By George A. Lawyer and Frank L. Earnshaw. 70 p. 1923.
- *1387-F. Laws relating to fur animals for the season 1923-24. By George A. Lawyer and Frank L. Earnshaw. 34 p. 1923.
- 1397-F. Mouse control in field and orchard. By James Silver. 14 p., illus. 1924. Price, 5 cents.
- *1444-F. Game laws for the season 1924-25. By Geo. A. Lawyer and Frank L. Earnshaw. 38 p. 1924. Revised, 1924.
- *1445-F. Laws relating to fur animals for the season 1924-25. By Frank G. Ashbrook and Frank L. Earnshaw. 22 p. 1924.
- 1456-F. Homes for birds. By E. R. Kalmbach and W. L. McAtee. 22 p., illus. 1925. Revised, 1926. Price, 5 cents.
- *1466-F. Game laws for the season 1925-26. By Geo. A. Lawyer and Frank L. Earnshaw. 46 p. 1925.
- *1469-F. Laws relating to fur animals for the season 1925-26. By Frank G. Ashbrook and Frank L. Earnshaw. 29 p. 1925.
- *1505-F. Game laws for the season 1926-27. By Talbott Denmead and Frank L. Earnshaw. 46 p. 1926.
- *1515-F. Fur laws for the season 1926-27. By Frank G. Ashbrook and Frank L. Earnshaw. 28 p. 1926.
- 1519-F. Rabbit skins for fur. By D. Monroe Green. 14 p., illus. 1927. Price, 5 cents.
- 1521-F. Propagation of game birds. By W. L. McAtee. 57 p., illus. 1927. Price, 10 cents.
- 1533-F. Rat control. By James Silver. 21 p., illus. 1927. Price, 5 cents.
- *1550-F. Game laws for the season 1927-28. By Frank L. Earnshaw. 46 p. 1927. Revised, 1927.
- *1552-F. Fur laws for the season 1927-28. By Frank G. Ashbrook, Frank L. Earnshaw, and Frank G. Grimes. 28 p. 1927.
- 1575-F. Game laws for the season 1928-29. By Frank L. Earnshaw. 46 p. 1928.
- 1576-F. Fur laws for the season 1928-29. By Frank L. Earnshaw and Frank G. Grimes. (In press.)

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- 4-L. Raising domestic rabbits. By D. Monroe Green. 6 p., illus. 1927. Revised, 1927. Price, 5 cents.
- 6-L. Experimental fur farm of the Biological Survey. By Frank G. Ashbrook and Karl B. Hanson. 6 p., illus. 1927. Price, 5 cents.
- 8-L. Mink raising. By Frank G. Ashbrook. 6 p., illus. 1927. Price, 5 cents.
- 15-L. Rabbit-house construction. Prepared by Bureau of Biological Survey and Bureau of Public Roads. 6 p., illus. 1927. Price, 5 cents.
- 21-L. Woodchuck control in the Eastern States. By James Silver. 6 p., illus. 1928. Price, 5 cents.
- 22-L. Chinchilla rabbits for food and fur. By D. Monroe Green. 6 p., illus. 1928. Price, 5 cents.

ANNUAL REPORTS¹⁷*Branch of Economic Ornithology Division of Entomology*

- *1886. By C. Hart Merriam, Chief. P. 227-258, illus. Including the following special reports: The English sparrow (p. 235-246), Ravages of rice birds (p. 246-250), The distribution and migration of birds (p. 250-252), Effects of mammals on agriculture (p. 252-253), Rabbits (p. 253-258).

Division of Economic Ornithology and Mammalogy

- *1887. *Ibid.* P. 399-456, illus. Including the following special reports: Food of hawks and owls, by A. K. Fisher (p. 402-422), Experiments in poisoning, by A. K. Fisher (p. 423-426), Results of a trip through Minnesota and Dakota, by Vernon Bailey (p. 426-454), Depredations of blackbirds and gophers in northern Iowa and southern Minnesota in the fall of 1887, by A. K. Fisher (p. 454-456).
- *1888. *Ibid.* P. 477-536, illus. Including the following special reports: Introduced pheasants, by C. Hart Merriam (p. 484-488), The mink, by C. Hart Merriam (p. 488-490), The sparrow hawk, by A. K. Fisher (p. 491-496), The short-eared owl, by A. K. Fisher (p. 496-498), The food of crows, by Walter B. Barrows (p. 498-535), The rose-breasted grosbeak, by Walter B. Barrows (p. 535-536).
- *1889. *Ibid.* P. 363-376, illus. Including the following special reports: Marsh hawk, by A. K. Fisher (p. 370-372), Common screech owl, by A. K. Fisher (p. 372-376).
- *1890. *Ibid.* P. 277-285. Including the following special reports: Seed planting by birds, by Walter B. Barrows (p. 280-285), Birds which feed on mulberries, by C. Hart Merriam (p. 285).
- *1891. *Ibid.* P. 267-271.
- *1892. *Ibid.* P. 181-200, illus. Including the following special reports: Notes on some of the spermophiles and pocket gophers of the

¹⁶ 1927—.¹⁷ From Reports of the Department. Printed as separates only, 1921 and 1924-27.

Mississippi Valley, by Vernon Bailey (p. 185-193), Economic ornithology, by Walter B. Barrows (p. 193-197), Food habits of the cedar bird, by F. E. L. Beal (p. 197-200).

- *1893. *Ibid.* P. 227-234, illus. Including the following special report: Food habits of the kingbird or bee martin, by Walter B. Barrows (p. 233-234).
- *1894. *Ibid.* P. 167-169.
- *1895. *Ibid.* P. 175-178.
- *1896. *Ibid.* P. 23-25.

Division of Biological Survey

- *1897. By C. Hart Merriam, Chief. P. 15-20.
- *1898. By T. S. Palmer, Acting Chief. P. 37-42.
- *1899. *Ibid.* P. 59-70.
- *1900. *Ibid.* P. 35-48.
- *1901. *Ibid.* P. 151-162.
- *1902. By C. Hart Merriam, Chief. P. 209-218.
- *1903. *Ibid.* P. 483-495.
- *1904. *Ibid.* P. 291-305.
- *1905. *Ibid.* P. 303-315.

Bureau of Biological Survey

- *1906. By Henry W. Henshaw, Acting Chief. P. 397-418.
- *1907. By C. Hart Merriam, Chief. P. 485-505.
- *1908. *Ibid.* P. 571-590.
- *1909. *Ibid.* P. 533-551.
- *1910. By Henry W. Henshaw, Chief. P. 549-565.
- *1911. *Ibid.* P. 533-550.
- *1912. *Ibid.* P. 659-680.
- *1913. *Ibid.* P. 223-236.
- *1914. *Ibid.* P. 199-210.
- *1915. *Ibid.* P. 233-247.
- *1916. *Ibid.* P. 237-252.
- *1917. By E. W. Nelson, Chief. P. 251-256.
- *1918. *Ibid.* P. 257-275.
- *1919. *Ibid.* P. 275-298.
- *1920. *Ibid.* P. 343-378.
- *1921. *Ibid.* P. 1-34.
- *1922. *Ibid.* P. 331-369.
- *1923. *Ibid.* P. 419-462.
- *1924. *Ibid.* P. 1-39.
- *1925. *Ibid.* P. 1-28.
- *1926. *Ibid.* P. 1-20.
- *1927. By Paul G. Redington, Chief. P. 1-27.
- 1928. *Ibid.* (In press.)

YEARBOOK ¹⁸

No.

- *9-Y. The geographic distribution of animals and plants in North America. By C. Hart Merriam. Yearbook for 1894. P. 203-214, illus. 1895.

¹⁸ 1895- . Those numbered were reprinted as separates.

- *10-Y. Hawks and owls from the standpoint of the farmer. By A. K. Fisher. Yearbook for 1894. P. 215-232, illus. 1895. (Superseded by Circular No. 61.)
- *11-Y. The crow blackbirds and their food. By F. E. L. Beal. Yearbook for 1894. P. 233-248, illus. 1895.
- 37-Y. Pt. 1. Four common birds of the farm and garden. By Sylvester D. Judd. Yearbook for 1895. P. 405-418, illus. 1896.
- 37-Y. Pt. 2. The meadow lark and Baltimore oriole. By F. E. L. Beal. Yearbook for 1895. P. 419-430, illus. 1896.
- *65-Y. Extermination of noxious animals by bounties. By T. S. Palmer. Yearbook for 1896. P. 55-68. 1897.
- *66-Y. The blue jay and its food. By F. E. L. Beal. Yearbook for 1896. P. 197-206, illus. 1897.
- *95-Y. Work of the department for the farmer: Biological Survey. By C. Hart Merriam. Yearbook for 1897. P. 115-122. 1898.
- *96-Y. Birds that injure grain. By F. E. L. Beal. Yearbook for 1897. P. 345-354. 1898.
- *132-Y. The danger of introducing noxious animals and birds. By T. S. Palmer. Yearbook for 1898. P. 87-110, illus. 1899.
- *133-Y. Birds as weed destroyers. By Sylvester D. Judd. Yearbook for 1898. P. 221-232, illus. 1899.
- *177-Y. A review of economic ornithology in the United States. By T. S. Palmer. Yearbook for 1899. P. 259-292, illus. 1900.
- *194-Y. The food of nestling birds. By Sylvester D. Judd. Yearbook for 1900. P. 411-436, illus. 1901.
- *197-Y. How birds affect the orchard. By F. E. L. Beal. Yearbook for 1900. P. 291-304, illus. 1901.
- *227-Y. The prairie dog of the Great Plains. By C. Hart Merriam. Yearbook for 1901. P. 257-270, illus. 1902.
- *247-Y. Two vanishing game birds. The woodcock and the wood duck. By A. K. Fisher. Yearbook for 1901. P. 447-458, illus. 1902.
- *263-Y. Audubon societies in relation to the farmer. By Henry Oldys. Yearbook for 1902. P. 205-218, illus. 1903.
- *275-Y. The agaves, a remarkable group of useful plants. By E. W. Nelson. Yearbook for 1902. P. 313-320, illus. 1903.
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- *6-SRA. Regulations for the Yukon Delta Reservation, Alaska. 1 p. 1915.
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- *4-P. Close seasons for game in North Carolina and Tennessee, 1902.
- *5-P. Close seasons for game in Maryland, District of Columbia, and Virginia, 1902.
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- *19-P. Open seasons for game in the United States and Canada, 1909.
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- *25-P. Open seasons for game in the District of Columbia, Maryland, and Virginia, 1911.
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- *34-P. Open seasons for game in the United States and Canada, 1916.
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- *36-P. Open seasons for game in North Carolina, 1917-18.
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- *41-P. Open seasons for game, 1922.
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- *43-P. Open seasons for game, 1924-25.
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- *45-P. Open seasons for game, 1926-27.
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- No. _____ Feed the birds this winter. 1916.
- * _____ Kill the rat. 1917.
- Bi-637. Join the war on rats. 1921.
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- Bi-695. Rodent-control campaign (Montana). 1923.
- *Bi-701. Why feed the coyote? (South Dakota). 1923.
- Bi-733. Vandals of the night (rats). 1923.
- Bi-734. Let's oust him (the rat). 1923.
- Bi-761. Rodent pests of Wyoming. 1924.

²¹ For use in local operations—not for general distribution.

- Bi-775. Arizona's four-million-dollar rodent problem. 1924.
 Bi-814. Killing pocket gophers (Arizona). 1925.
 Bi-815. Poison the pocket gopher (Kansas). 1925.
 Bi-818. Killing pocket gophers (Utah). 1925.
 Bi-862. Poison the pocket gopher (Washington). 1926.
 Bi-864. This pasture once a prairie-dog town (Wyoming). 1926.
 Bi-868. Killing pocket gophers (Colorado). 1926.
 Bi-898. Rabbit meat. 1926.
 Bi-924. Utah pocket gopher. 1927.
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North America, 1st Provisional Map	1890	Merriam, C. Hart. Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Ariz. North Amer. Fauna No. 3.
San Francisco Mountains...	1890	Ditto.
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North America, 3d Provisional Map	1894	Report of the Ornithologist and Mammalogist for 1893 (in Report of the Secretary of Agriculture). Reprinted in Merriam, C. H. Laws of Temperature Control of the Geographic Distribution of Terrestrial Animals and Plants. Nat. Geog. Mag., vol. 6, p. 229-238, December 29.
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(B) COMPILATION OF LAWS

R. S., Section 520.—Establishment of the Department of Agriculture—[Act of May 15, 1862, Section 1; 12 Stat. L., 387].

SEC. 520. There shall be at the seat of Government a Department of Agriculture, the general design and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture, in the most general and comprehensive sense of that word. . . .

R. S., Section 523.—Officers and employees—[Act of May 15, 1862, Section 4; 12 Stat. L., 387].

SEC. 523. The Commissioner [Secretary]¹ of Agriculture shall appoint . . . such other employees as Congress, may from time to time provide, with salaries corresponding to the salaries of similar officers in other Departments of the Government; and he shall, as Congress may from time to time provide, employ other persons for such time as their services may be needed, including chemists, botanists, entomologists, and other persons skilled in the natural sciences pertaining to agriculture.

R. S., Section 526.—Duties of Commissioner [Secretary] [Act of May 15, 1862, Section 3; 12 Stat. L., 387].

SEC. 526. The Commissioner [Secretary]¹ of Agriculture shall procure and preserve all information concerning Agriculture which he can obtain by means of books and correspondence, and by practical and scientific experiments, accurate records of which experiments shall be kept in his Office, by the collection of statistics, and by other appropriate means within his power. . . .

1885—Act of March 3, 1885 (23 Stat. L., 353, 354)—An Act Making an appropriation for the Agricultural Department for the fiscal year ending June thirtieth, eighteen hundred and eighty-six, and for other purposes.

ENTOMOLOGICAL DIVISION

. . . and for the promotion of economic ornithology, or the study of interrelation of birds and agriculture, an investigation of the food, habits, and migration of birds in relation to both insects and plants, and publishing report thereon. . . .

1886—Act of June 30, 1886 (24 Stat. L., 100, 101)—An Act Making an appropriation for the Department of Agriculture for the fiscal year ending June thirtieth, eighteen hundred and eighty-seven, and for other purposes.

¹ Act of February 9, 1889. See also act of July 14, 1890.

DIVISION OF ECONOMIC ORNITHOLOGY AND MAMMALOLOGY

For the promotion of economic ornithology and mammalogy; and investigation of the food-habits, distribution, and migrations of North American birds and mammals in relation to agriculture, horticulture and forestry; for publishing reports thereon; and for drawings and traveling and other expenses in the practical work of the division, ten thousand dollars.

1889—Act of February 9, 1889 (25 Stat. L., 659)—An Act To enlarge the powers and duties of the Department of Agriculture and to create an Executive Department to be known as the Department of Agriculture.

[SECTION. 1]. That the Department of Agriculture,² shall be an Executive Department, under the supervision and control of a Secretary of Agriculture, who shall be appointed by the President, by and with the advice and consent of the Senate; and section one hundred and fifty-eight of the Revised Statutes is hereby amended to include such Department, and the provisions of title four of the Revised Statutes, including all amendments thereto, are hereby made applicable to said Department.

* * * *

SEC. 4. That all laws and parts of laws relating to the Department of Agriculture now in existence, as far as the same are applicable and not in conflict with this act, and only so far, are continued in full force and effect.

1890—Act of July 14, 1890 (26 Stat. L., 282, 283, 285, 288)—An Act Making appropriation for the Department of Agriculture for the fiscal year ending June thirtieth, anno Domini eighteen hundred and ninety-one.

* * * *

Division of Economic Ornithology and Mammalogy: One ornithologist, two thousand five hundred dollars; one assistant ornithologist, one thousand six hundred dollars; one assistant ornithologist one thousand five hundred dollars; one assistant ornithologist, one thousand four hundred dollars; one clerk class one, one thousand two hundred dollars; one clerk, at one thousand dollars; one clerk, at six hundred and sixty dollars; in all, nine thousand eight hundred and sixty dollars.

MISCELLANEOUS

* * * *

Division of ornithology³ and mammalogy: For investigating the geographic distribution of animals and plants, and for the promotion of economic ornithology and mammalogy, and investigation of the food-habit of North American birds and mammals in relation to agriculture, horticulture, and forestry; for publishing reports thereon, and for illustrations, field-work,

² See act of July 14, 1890.

³ First instance of omission of "Economic" in laws.

traveling, and other expenses in the practical work of the division, fifteen thousand dollars, of which sum one thousand dollars may be applied on account of expenses incurred during the fiscal year ending June thirtieth, eighteen hundred and ninety.

* * * *

And the said Secretary [of Agriculture] is hereby authorized and directed to perform all the duties named in said acts⁴ and all other acts of Congress in force on February eighth, eighteen hundred and eighty-nine, to be performed by the Commissioner of Agriculture.

1894—Act of August 8, 1894 (28 Stat. L., 264, 265, 267)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, eighteen hundred and ninety-five.

* * * *

Investigations in Ornithology and Mammalogy, Division of Ornithology and Mammalogy: For biological⁵ investigations, including the geographic distribution and migrations of animals, birds, and plants, for the promotion of economic ornithology and mammalogy, an⁶ investigation of the food habits of North American birds and mammals in relation to agriculture, horticulture, and forestry; for printing and publishing reports thereon, and for illustrations, field work, and traveling, and other expenses in the practical work of the division, seventeen thousand five hundred dollars.

1895—Act of March 2, 1895 (28 Stat. L., 727, 728, 730)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, eighteen hundred and ninety-six.

* * * *

Division of Economic Ornithology and Mammalogy: One ornithologist who shall be chief of division, . . .

* * * *

1896—Act of April 25, 1896 (29 Stat. L., 99, 100, 102)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, eighteen hundred and ninety-seven.

* * * *

Division of Biological Survey: One biologist, who shall be chief of division, . . .

* * * *

⁴ Referring to 23 Stat. L., 31 and 25 Stat. L., 333, relating to establishment and maintenance of the Bureau of Animal industry.

⁵ First use of word "biological" in the laws.

⁶ Compare with the "and" of act of July 14, 1890 (26 Stat. L., 282, 283, 285.)

Biological Survey, Division of Biological Survey: For biological investigations, including the geographic distribution and migrations of animals, birds, and plants, and for the promotion of economic ornithology and mammalogy, an investigation of the food habits of the North American birds and mammals in relation to agriculture, horticulture, and forestry; for preparation and publication of reports thereon, and for illustrations, field work, and traveling, and other expenses in the practical work of the division, seventeen thousand five hundred dollars.

1900—Act of May 25, 1900 (31 Stat. L., 187)—An Act To enlarge the powers of the Department of Agriculture, prohibit the transportation by interstate commerce of game killed in violation of local laws, and for other purposes.

[SECTION 1]. That the duties and powers of the Department of Agriculture are hereby enlarged so as to include the preservation, distribution, introduction, and restoration of game birds and other wild birds. The Secretary of Agriculture is hereby authorized to adopt such measures as may be necessary to carry out the purposes of this Act and to purchase such game birds and other wild birds as may be required therefor, subject, however, to the laws of the various States and Territories. The object and purpose of this Act is to aid in the restoration of such birds in those parts of the United States adapted thereto where the same have become scarce or extinct, and also to regulate the introduction of American or foreign birds or animals in localities where they have not theretofore existed.

The Secretary of Agriculture shall from time to time collect and publish useful information as to the propagation, uses, and preservation of such birds.

And the Secretary of Agriculture shall make and publish all needful rules and regulations for carrying out the purposes of this Act, and shall expend for said purposes such sums as Congress may appropriate therefor.

SEC. 2. That it shall be unlawful for any person or persons to import into the United States any foreign wild animal or bird except under special permit from the United States Department of Agriculture:

Provided, That nothing in this section shall restrict the importation of natural history specimens for museums or scientific collections, or the importation of certain cage birds, such as domesticated canaries, parrots, or such other species as the Secretary of Agriculture may designate.

The importation of the mongoose, the so-called "flying-foxes" or fruit bats, the English sparrow, the starling, or such other birds or animals as the Secretary of Agriculture may from time to time declare injurious to the interest of agriculture or horticulture is hereby prohibited, and such species upon arrival at any of the ports of the United States shall be destroyed or returned at the expense of the owner. The Secretary of the Treasury is hereby authorized to make regulations for carrying into effect the provisions of this section.

SEC. 3. That it shall be unlawful for any person or persons to deliver to any common carrier, or for any common carrier to transport from one State or Territory to another State or Territory, or from the District of Columbia or Alaska to any State or Territory, or from any State or Territory to the

District of Columbia or Alaska, any foreign animals or birds the importation of which is prohibited, or the dead bodies or parts thereof of any wild animals or birds, where such animals or birds have been killed in violation of the laws of the State, Territory, or District in which the same were killed:

Provided, That nothing herein shall prevent the transportation of any dead birds or animals killed during the season when the same may be lawfully captured, and the export of which is not prohibited by law in the State, Territory, or District in which the same are killed.

SEC. 4. That all packages containing such dead animals, birds, or parts thereof, when shipped by interstate commerce, as provided in section one of this Act, shall be plainly and clearly marked, so that the name and address of the shipper and the nature of the contents may be readily ascertained on inspection of the outside of such packages.

For each evasion or violation of this Act the shipper shall, upon conviction, pay a fine of not exceeding two hundred dollars; and the consignee knowingly receiving such articles so shipped and transported in violation of this Act shall, upon conviction, pay a fine of not exceeding two hundred dollars; and the carrier knowingly carrying or transporting the same shall, upon conviction, pay a fine of not exceeding two hundred dollars.

SEC. 5. That all dead bodies, or parts thereof, of any foreign game animals, or game or song birds, the importation of which is prohibited, or the dead bodies, or parts thereof, of any wild game animals, or game or song birds transported into any State or Territory, or remaining therein for use, consumption, sale, or storage therein, shall upon arrival in such State or Territory be subject to the operation and effect of the laws of such State or Territory enacted in the exercise of its police powers, to the same extent and in the same manner as though such animals or birds had been produced in such State or Territory, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise.

This Act shall not prevent the importation, transportation, or sale of birds or bird plumage manufactured from the feathers of barnyard fowl.

1900—Act of June 6, 1900 (31 Stat. L., 321, 322, 332)—An Act Making further provision for a civil government for Alaska, and for other purposes.

* * * *

SEC. 2. The governor shall from time to time inquire into the operations of any person, company, association, or corporation authorized by the United States, by contract or otherwise, to kill seal or other fur-bearing animals in the district, and any and all violations by such person, company, association, or corporation of the agreement with the United States under which the operations are being conducted, and shall annually report to Congress the result of such inquiries.

* * * *

SEC. 463. That no person shall break, take from the nest, or have in possession the eggs of any crane, wild duck, brant, or goose; nor shall any person transport or ship out of said Territory the eggs or the contents of the eggs of any crane, wild duck, brant, or goose; nor shall any person, common carrier or other transportation company carry or receive for

shipment such eggs or the contents of said eggs, and any person or company who shall have in possession or receive for shipment or transportation any eggs or the contents of any eggs of the crane, wild duck, brant, or goose shall be guilty of a misdemeanor and upon conviction be punished as provided in this section. Any person or company violating the provisions of this section shall be punished by a fine not exceeding five hundred dollars or imprisonment not exceeding six months."

1901—Act of March 2, 1901 (31 Stat. L., 922, 932)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and two.

* * * *

Division of Biological Survey, Salaries: One biologist, who shall be chief of division, two thousand five hundred dollars; one assistant biologist, who shall be assistant chief of division, one thousand eight hundred dollars; two assistant biologists, at one thousand five hundred dollars each, three thousand dollars; one assistant biologist, one thousand four hundred dollars; one clerk class one, one thousand two hundred dollars; two clerks, at one thousand dollars each, two thousand dollars; one clerk, nine hundred dollars; in all, twelve thousand eight hundred dollars.

General Expenses of Biological Investigations: For biological investigations, including the geographic distribution and migrations of animals, birds, and plants; for the promotion of economic ornithology and mammalogy; for an investigation of the food habits of North American birds and mammals in relation to agriculture, horticulture, and forestry; for the employment of local and special agents, clerks, assistants, and other labor required in conducting experiments, in the city of Washington and elsewhere, and in collating, digesting, reporting, and illustrating the results of such experiments; for freight and express charges; for preparation and publication of reports, and for illustrations, field work and traveling and other expenses in the practical work of the division, and to enable the Secretary of Agriculture to carry into effect the provisions of an Act approved May twenty-fifth, nineteen hundred, entitled "An Act to enlarge the powers of the Department of Agriculture, prohibiting the transportation by interstate commerce of game killed in violation of local laws, and for other purposes," twenty thousand dollars of which shall be immediately available.

1902—Act of June 3, 1902 (32 Stat. L., 285)—An Act To regulate the introduction of eggs of game birds for propagation.

That from and after the passage of this Act the Secretary of Agriculture shall have the power to authorize the importation of eggs of game birds for purposes of propagation, and he shall prescribe all necessary rules and regulations governing the importation of eggs of said birds for such purposes.⁷

⁷ See tariff act of July 24, 1897 (30 Stat. L., 151, 197), which prohibited egg importations save for scientific collections.

1902—Act of June 7, 1902 (32 Stat. L., 327)—An Act For the protection of game in Alaska, and for other purposes.

[SECTION 1]. That from and after the passage of this Act the wanton destruction of wild game animals or wild birds, the destruction of nests and eggs of such birds, or the killing of any wild birds other than a game bird, or wild game animal, for the purposes of shipment from Alaska is hereby prohibited. The term "game animals" shall include deer, moose, caribou, sheep, mountain goats, bears, sea lions, and walrus. The term "game birds" shall include water fowl, commonly known as ducks, geese, brant, and swans; shore birds, commonly known as plover, snipe, and curlew, and the several species of grouse and ptarmigan. Nothing in this Act shall affect any law now in force in Alaska relating to the fur seal, sea otter, or any fur-bearing animal other than bears and sea lions, or prevent the killing of any game animal or bird for food or clothing by native Indians or Eskimo or by miners, explorers, or travelers on a journey when in need of food; but the game animals or birds so killed shall not be shipped or sold.

SEC. 2. That it shall be unlawful for any person in Alaska to kill any wild game animals or wild birds except during the seasons hereinafter provided: Large brown bears, from April fifteenth to June thirtieth, both inclusive; moose, caribou, walrus, and sea lions, from September first to October thirty-first, both inclusive; deer, sheep, and mountain goats, from September first to December fifteenth, both inclusive; grouse, ptarmigan, shore birds, and water fowl, from September first to December fifteenth, both inclusive: *Provided*, That the Secretary of Agriculture is hereby authorized whenever he shall deem it necessary for the preservation of game animals or birds to make and publish rules and regulations which shall modify the close seasons hereinbefore established, or provide different close seasons for different parts of Alaska, or place further restrictions and limitations on the killing of such animals or birds in any given locality, or to prohibit killing entirely for a period not exceeding five years in such locality.

SEC. 3. That it shall be unlawful for any person at any time to kill any females or yearlings of moose, caribou, deer, or sheep, or for any one person to kill in any one year more than the number specified of each of the following game animals: Two moose, walrus, or sea lions, four caribou, sheep, goats, or large brown bears; eight deer, or to kill or have in possession in any one day more than ten grouse or ptarmigan, or twenty-five shore birds or waterfowl.

That it shall be unlawful for any person at any time to hunt with hounds, to use a shotgun larger than number ten gauge, or any gun other than that which can be fired from the shoulder, or to use steam launches or any boats other than those propelled by oars or paddles in the pursuit of game animals or birds. And the Secretary of Agriculture is authorized to make and publish such further restrictions as he may deem necessary to prevent undue destruction of wild game animals or wild birds.

SEC. 4. That it shall be unlawful for any person or persons at any time to sell or offer for sale any hides, skins, or heads of any game animals or game birds in Alaska, or to sell, or offer for sale therein, any game animals or game birds, or parts thereof, during the time when the killing of said

animals or birds is prohibited: *Provided*, that it shall be lawful for dealers having in possession any game animals or game birds legally killed during the open season to dispose of the same within fifteen days after the close of said season.

SEC. 5. That it shall be unlawful for any person, firm, or corporation or their officers or agents to deliver to any common carrier, or for the owner, agent, or master of any vessel or for any other person to receive for shipment or have in possession with intent to ship out of Alaska any hides or carcasses of caribou, deer, moose, mountain sheep, or mountain goat, or parts thereof, or any wild birds or parts thereof: *Provided*, That nothing in this Act shall be construed to prevent the collection of specimens for scientific purposes, the capture or shipment of live animals and birds for exhibition or propagation, or the export from Alaska of specimens and trophies, under such restrictions and limitations as the Secretary of Agriculture may prescribe and publish.

SEC. 6. That any person violating any of the provisions of this Act or any of the regulations promulgated by the Secretary of Agriculture shall be deemed guilty of a misdemeanor, and upon conviction thereof shall forfeit to the United States all game or birds in his possession, and all guns, traps, nets, or boats used in killing or capturing said game birds, and shall be punished for each offense by a fine of not more than two hundred dollars or imprisonment not more than three months, or by both such fine and imprisonment, in the discretion of the court: *Provided*, That upon conviction for the second or any subsequent offense there may be imposed in addition a fine of fifty dollars for any violation of sections one and three, and a fine of one hundred dollars for a violation of section two. It is hereby made the duty of all marshals and deputy marshals, collectors or deputy collectors of customs appointed for Alaska, and all officers of revenue cutters to assist in the enforcement of this Act. Any marshal or deputy marshal may arrest without warrant any person found violating any of the provisions of this Act or any of the regulations herein provided, and may seize any game, birds, or hides, and any traps, nets, guns, boats, or other paraphernalia used in the capture of such game or birds and found in the possession of said person, and any collector or deputy collector of customs, or any person authorized in writing by a marshal, shall have the power above provided to arrest persons found violating this Act or said regulations and seize said property without warrant, to keep and deliver the same to a marshal or a deputy marshal. It shall be the duty of the Secretary of the Treasury upon request of the Secretary of Agriculture to aid in carrying out the provisions of this Act: *Provided further*, That nothing contained in the foregoing sections of this Act shall be construed or held to prohibit or limit the right of the Smithsonian Institution to collect in or ship from the District of Alaska animals or birds for the use of the Zoological Park in Washington, District of Columbia: *Provided further*, That such heads and hides as may have been taken before the passage of this Act, may be shipped out of Alaska at any time prior to the first day of July, anno Domini nineteen hundred and two.

1903—Act of March 3, 1903 (32 Stat. L., 1147, 1161)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and four.

* * * *

To enable the Secretary of Agriculture to move or transport elk or other game animals presented to the Government or owned by it, and to fence, maintain, feed and care for them on forest reserves or other public lands, one thousand dollars.*

1905—Act of March 3, 1905 (33 Stat. L., 861, 877)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and six.

BUREAU OF BIOLOGICAL SURVEY

Salaries, Bureau of Biological Survey: One biologist, who shall be chief of Bureau, . . .

1906—Act of June 28, 1906 (34 Stat. L., 536)—An Act To protect birds and their eggs in game and birds preserves.*

[SECTION 1]. That it shall be unlawful for any person to hunt, trap, capture, willfully disturb, or kill any bird of any kind whatever or take the eggs of such birds on any lands of the United States which have been set apart or reserved as breeding grounds for birds by any law, proclamation, or Executive order, except under such rules and regulations as may be prescribed from time to time by the Secretary of Agriculture.

SEC. 2. That any person violating the provisions of this Act shall be deemed guilty of a misdemeanor and shall, upon conviction in any United States court of competent jurisdiction, be fined in a sum not exceeding five hundred dollars or be imprisoned for a period not exceeding six months, or shall suffer both fine and imprisonment, in the discretion of the court: *Provided*, That the provisions of this Act shall not apply to the Black Hills Forest Reservation, in South Dakota.

1907—Act of March 4, 1907 (34 Stat. L., 1256, 1274)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and eight.

BUREAU OF BIOLOGICAL SURVEY

Biological Investigations: . . . And the Secretary of Agriculture is hereby directed to investigate and report to the next session of Congress to what extent, if any, the work now being done by the Bureau of Biological Survey

* A similar appropriation applying to elk alone was made in the act of April 23, 1904 (33 Stat. L., 276, 290).

* See acts of March 4, 1909 (35 Stat. L., 1088, 1137, 1138), and April 5, 1924 (43 Stat. L., 98).

is duplicated by any other Department of the Government, and to what extent the work of this Bureau is of practical value to the agricultural interests of the country.³⁰

1908—Act of May 11, 1908 (35 Stat. L., 102)—An Act To amend an Act entitled "An Act for the protection of game in Alaska, and for other purposes," approved June seventh, nineteen hundred and two.³¹

[SECTION 1]. That an Act entitled "An Act for the protection of game in Alaska, and for other purposes," approved June seventh, nineteen hundred and two, be amended to read as follows:

"From and after the passage of this Act the wanton destruction of wild game animals or wild birds, except eagles, ravens, and cormorants, the destruction of nests and eggs of such birds, or the killing of any wild birds, other than game birds, except eagles, for the purposes of selling the same or the skins or any part thereof, except as hereinafter provided, is hereby prohibited.

"Game Defined.—The term 'game animals' shall include deer, moose, caribou, mountain sheep, mountain goats, brown bear, sea lions, and walrus. The term 'game birds' shall include water fowl, commonly known as ducks, geese, brant, and swans; shore birds, commonly known as plover, snipe, and curlew, and the several species of grouse and ptarmigan.

"Exemptions.—Nothing in this Act shall affect any law now in force in Alaska relating to the fur seal, sea otter, or any fur-bearing animal or prevent the killing of any game animal or bird for food or clothing at any time by natives, or by miners or explorers, when in need of food; but the game animals or birds so killed during close season shall not be shipped or sold.

"SEC. 2. Season.—That it shall be unlawful for any person in Alaska to kill any wild game animals or birds, except during the season hereinafter provided: North of latitude sixty-two degrees, brown bear may be killed at any time; moose, caribou, sheep, walrus, and sea lions from August first to December tenth, both inclusive; south of latitude sixty-two degrees, moose, caribou, and mountain sheep from August twentieth to December thirty-first, both inclusive; brown bear from October first to July first, both inclusive; deer and mountain goats from April first to February first, both inclusive; grouse, ptarmigan, shorebirds, and waterfowl from September first to March first, both inclusive: *Provided*, That no caribou shall be killed on the Kenai Peninsula before August twentieth, nineteen hundred and twelve: *And provided further*, That the Secretary of Agriculture is hereby authorized, whenever he shall deem it necessary for the preservation of game animals or birds, to make and publish rules and regulations prohibiting the sale of any game in any locality modifying the close seasons hereinbefore established, providing different close seasons for different parts of Alaska, placing further restrictions and limitations on the killing of such animals or birds in any given locality, or prohibiting killing entirely for a period not exceeding two years in such locality.

³⁰ See Report on work of Biological Survey, 60 Cong., Sen. doc. 132.

³¹ See Joint Res. June 7, 1924 (43 Stat. L., 668), and acts of January 13, 1925 (43 Stat. L., 739, 747), and February 10, 1925 (43 Stat. L., 822, 841).

"SEC. 3. Number.—That it shall be unlawful for any person to kill any female or yearling moose or for any one person to kill in any one year more than the number specified of each of the following animals: Two moose, one walrus or sea lion, three caribou, three mountain sheep, three brown bear, or to kill or have in his possession in any one day more than twenty-five grouse or ptarmigan or twenty-five shore birds or waterfowl.

"Guns and Boats.—That it shall be unlawful for any person at any time to hunt with dogs any of the game animals specified in this Act; to use a shotgun larger than number ten gauge, or any gun other than that which can be fired from the shoulder; or to use steam launches or any boats other than those propelled by oars or paddles in the pursuit of game animals or birds.

"SEC. 4. Sale.—That it shall be unlawful for any person or persons at any time to sell or offer for sale any hides, skins, or heads of any game animals or game birds in Alaska, or to sell, offer for sale, or purchase, or offer to purchase, any game animals or game birds, or parts thereof, during the time when the killing of such animals or birds is prohibited: *Provided*, That it shall be lawful for dealers having in possession game animals or game birds legally killed during the open season to dispose of the same within fifteen days after the close of said season.

"SEC. 5. Licenses.—That it shall be unlawful for any nonresident of Alaska to hunt any of the game animals protected by this Act, except deer and goats, without first obtaining a hunting license, to hunt on the Kenai Peninsula without a registered guide, and such license shall not be transferable and shall be valid only during the calendar year in which issued. Each applicant shall pay a fee of one hundred dollars for such license, unless he be a citizen of the United States, in which case he shall pay a fee of fifty dollars. Each license shall be accompanied by coupons authorizing the shipment of two moose if killed north of latitude sixty-two degrees, four deer, three caribou, three mountain sheep, three goats, and three brown bear, or any part of said animals, but no more of any one kind.

"A resident of Alaska desiring to export heads or trophies of any of the game animals mentioned in this Act shall first obtain a shipping license, for which he shall pay a fee of forty dollars, permitting the shipment of heads or trophies of one moose, if killed north of latitude sixty-two degrees, four deer, two caribou, two sheep, two goats, and two brown bear, but no more of any one kind; or a shipping license, for which he shall pay a fee of ten dollars, permitting the shipment of a single head or trophy of caribou or sheep; or a shipping license, for which he shall pay a fee of five dollars, permitting the shipment of a single head or trophy of any goat, deer, or brown bear. Any person wishing to ship moose killed south of latitude sixty-two degrees must first obtain a special shipping license, for which he shall pay a fee of one hundred and fifty dollars, permitting the shipment of one moose, or any part thereof. Not more than one general license and two special moose licenses shall be issued to any one person in one year: *Provided*, That before any trophy shall be shipped from Alaska under the provisions of this Act the person desiring to make such shipment shall first make and file with the customs office at the port where such shipment is to be made an affidavit to the effect that he has not violated any of the provisions of this Act; that the trophy which he desires to ship has not been bought or purchased and has not been sold and is not being shipped for the purpose of being sold, and that he is the owner of the trophy which

he desires to ship, and if the trophy is that of moose, whether the animal from which it was taken was killed north or south of latitude sixty-two degrees: *Provided further*, That any resident of Alaska prior to September first, nineteen hundred and eight, may without permit or license ship any head or trophy of any of the game animals herein mentioned upon filing an affidavit with the customs office at the port where such shipment is to be made that the animal from which said head or trophy was taken was killed prior to the passage of this Act. Any affidavit required by the provisions of this Act may be subscribed and sworn to before any customs officer or before any officer competent to administer an oath.

"The governor of Alaska is hereby authorized to issue licenses for hunting and shipping big game. On issuing a license he shall require the applicant to state whether the heads or trophies to be obtained or shipped under said license will pass through the ports of entry at Seattle, Washington, Portland, Oregon, or San Francisco, California, and he shall forthwith notify the collector of customs at the proper port of entry as to the name of the holder of the license and the name and address of the consignee. All proceeds from licenses, except one dollar from each fee, which shall be retained by the clerk issuing the license to cover the cost of printing and issue, shall be paid into the Treasury of the United States as miscellaneous receipts; the amount necessary for the enforcement of this Act shall be estimated for annually by the Agricultural Department and appropriated for including the employment and salaries to be paid to game wardens herein authorized. And the governor shall annually make a detailed and itemized report to the Secretary of Agriculture, in which he shall state the number and kind of licenses issued, the money received, which report shall also include a full statement of all trophies exported and all animals and birds exported for any purpose.

"And the governor of Alaska is further authorized to employ game wardens, to make regulations for the registration and employment of guides, and fix the rates for licensing guides and rates of compensation for guiding. Every person applying for a guide license shall, at the time of making such application, make and file with the person issuing such license an affidavit to the effect that he will obey all the conditions of this Act and of the regulations thereunder, that he will not violate any of the game laws or regulations of Alaska, and that he will report all violations of such laws and regulations that come to his knowledge. Any American citizen or native of Alaska, of good character, upon compliance with the requirements of this Act, shall be entitled to a guide license. Any guide who shall fail or refuse to report any violation of this Act, or who shall himself violate any of the provisions of this Act, shall have his license revoked, and in addition shall be liable to the penalty provided in section seven of this Act, and shall be ineligible to act as guide for a period of five years from the date of conviction.

"SEC. 6. That it shall be unlawful for any persons, firm, or corporation, or their officers or agents, to deliver to any common carrier, or for the owner, agent, or master of any vessel or for any other person, to receive for shipment or have in possession with intent to ship out of Alaska, any wild birds, except eagles, or parts thereof, or any heads, hides, or carcasses of brown bear, caribou, deer, moose, mountain sheep, or mountain goats, or parts thereof, unless said heads, hides, or carcasses are accompanied by the required license or coupon and by a copy of the affidavit required by section

five of this Act: *Provided*, That nothing in this Act shall be construed to prevent the collection of specimens for scientific purposes, the capture or shipment of live animals and birds for exhibition or propagation, or the export from Alaska of specimens under permit from the Secretary of Agriculture, and under such restrictions and limitations as he may prescribe and publish.

"It shall be the duty of the collector of customs at Seattle, Portland, and San Francisco to keep strict account of all consignments of game animals received from Alaska, and no consignment of game shall be entered until due notice thereof has been received from the governor of Alaska or the Secretary of Agriculture, and found to agree with the name and address on the shipment. In case consignments arrive without licenses they shall be detained for sixty days, and if a license be not then produced said consignments shall be forfeited to the United States and shall be delivered by the collector of customs to the United States marshal of the district for such disposition as the court may direct.

"SEC. 7. Penalties.—That any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall forfeit to the United States all game or birds in his possession, and all guns, traps, nets, or boats used in killing or capturing said game or birds, and shall be punished for each offense by a fine of not more than two hundred dollars or imprisonment not more than three months, or by both such fine and imprisonment, in the discretion of the court. Any person making any false or untrue statements in any affidavit required by this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall forfeit to the United States all trophies in his possession, and shall be punished by a fine in any sum not more than two hundred dollars or imprisonment not more than three months, or by both such fine and imprisonment, in the discretion of the court.

"Enforcement.—It is hereby made the duty of all marshals and deputy marshals, collectors or deputy collectors of customs, all officers of revenue cutters, and all game wardens to assist in the enforcement of this Act. Any marshal, deputy marshal, or warden in or out of Alaska may arrest without warrant any person found violating any of the provisions of this Act or any of the regulations herein provided, and may seize any game, birds, or hides, and any traps, nets, guns, boats, or other paraphernalia used in the capture of such game or birds and found in the possession of said persons in or out of Alaska, and any collector or deputy collector of customs, or warden, or licensed guide, or any person authorized in writing by a marshal shall have the power above provided to arrest persons found violating this Act or said regulations and seize said property without warrant to keep and deliver the same to a marshal or a deputy marshal. It shall be the duty of the Secretary of the Treasury, upon request of the governor or Secretary of Agriculture, to aid in carrying out the provisions of this Act.

"SEC. 8. That all Acts or parts of Acts in conflict with the provisions of this Act are hereby repealed."²²

²² Appropriations for making this law effective were made from 1909 (act of March 4, 1909, 35 Stat. L., 945, 990) to 1921 (act of March 4, 1921, 41 Stat. L., 1367, 1406) under the sundry civil appropriation acts. From then till the passage of the Alaska Game Law of January 13, 1925, they were under the Interior Department appropriation acts, the last one being in the act of June 25, 1924 (43 Stat. L., 390, 428).

1908—Act of May 23, 1908 (35 Stat. L., 251, 262, 267)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and nine.

MISCELLANEOUS

National Bison Range: The President is hereby directed to reserve and except from the unallotted lands now embraced within the Flathead Indian Reservation, in the State of Montana, not to exceed twelve thousand eight hundred acres of said lands, near the confluence of the Pend d'Oreille and Jocko rivers, for a permanent national bison range for the herd of bison to be presented by the American Bison Society. And there is hereby appropriated the sum of thirty thousand dollars, or so much thereof as may be necessary, to enable the Secretary of the Interior to pay the confederated tribes of the Flathead, Kootenai, and Upper Pend d'Oreille, and such other Indians and persons holding tribal relations or may rightfully belong on said Flathead Indian Reservation, the appraised value of said lands as shall be fixed and determined under the provisions of the Act of Congress approved April twenty-third, nineteen hundred and four, entitled "An Act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment." And the Secretary of Agriculture is hereby authorized and directed to inclose said lands with a good and substantial fence and to erect thereon the necessary sheds and buildings for the proper care and maintenance of the bison; and there is hereby appropriated therefor the sum of ten thousand dollars or so much thereof as may be necessary; in all, forty thousand dollars.

1909—Act of March 4, 1909 (35 Stat. L., 1039, 1051, 1052)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and ten.

BUREAU OF BIOLOGICAL SURVEY

Salaries, Bureau of Biological Survey: One biologist, who shall be chief of bureau, three thousand dollars; one clerk, class four; one clerk, class two; one clerk, class one; two clerks, at one thousand dollars each; two clerks, at nine hundred dollars each; one messenger, seven hundred and twenty dollars; one messenger or laborer, four hundred and eighty dollars; one laborer, six hundred dollars; in all, thirteen thousand dollars.

General Expenses, Bureau of Biological Survey: For salaries, employment of labor, and rent in the city of Washington and elsewhere, furniture, supplies, traveling, and all other expenses necessary in conducting investigations and carrying out the work of the bureau, as follows:

For the enforcement of the Act approved May twenty-fifth, nineteen hundred, entitled, "An Act to enlarge the powers of the Department of

Agriculture, prohibit the transportation by interstate commerce of game killed in violation of local laws, and for other purposes, nine thousand four hundred and twenty dollars;

For the maintenance of the Montana National Bison Range and other reservations for mammals and birds, seven thousand dollars; and so much of the forty thousand dollars heretofore appropriated for the Montana National Bison Range as remains unexpended is hereby reappropriated, the same to be immediately available, to be expended in fencing said lands, the erection thereon of the necessary sheds and buildings, and enlarging the limits heretofore established so as to make the total acreage not to exceed twenty thousand acres, and the President is hereby directed to reserve and except from the unallotted lands now embraced within the Flathead Indian Reservation, in the State of Montana, a sufficient area to enlarge said range as herein provided;

For investigating the food habits of North American birds and mammals in relation to agriculture, horticulture, and forestry, including experiments and demonstrations in destroying noxious animals,¹³ twenty-five thousand dollars;

For biological investigations, including the relations, habits, geographic distribution and migrations of animals and plants and the preparation of maps of the life and crop zones, eighteen thousand dollars;

For general administrative expenses connected with the above mentioned lines of work, including cooperation with other federal bureaus, departments, boards, and commissions on request from them, fifteen thousand dollars;

In all, for general expenses, seventy-four thousand four hundred and twenty dollars.

Total for Bureau of Biological Survey, eighty-seven thousand four hundred and twenty dollars.¹⁴

1909—Act of March 4, 1909 (35 Stat. L., 1088, 1104, 1137)—An Act To codify, revise, and amend the penal laws of the United States.

* * * *

SEC. 84. Whoever shall hunt, trap, capture, willfully disturb, or kill any bird of any kind whatever, or take the eggs of any such bird, on any lands of the United States which have been set apart or reserved as breeding grounds for birds, by any law, proclamation, or executive order, except under such rules and regulations as the Secretary of Agriculture may, from time to time, prescribe, shall be fined not more than five hundred dollars, or imprisoned not more than six months, or both.¹⁵

* * * *

¹³ First appropriation for this purpose.

¹⁴ The form adopted in this act is substantially the form used for Biological Survey appropriations to-day.

¹⁵ See acts June 28, 1906 (34 Stat. L., 536), and April 15, 1924 (43 Stat. L., 98).

SEC. 241. The importation into the United States, or any Territory or District thereof, of the mongoose, the so-called "flying foxes" or fruit bats, the English sparrow, the starling, and such other birds and animals, as the Secretary of Agriculture may from time to time declare to be injurious to the interests of agriculture or horticulture, is hereby prohibited; and all such birds and animals shall, upon arrival at any port of the United States, be destroyed or returned at the expenses of the owner. No person shall import into the United States or into any Territory or District thereof, any foreign wild animal or bird, except under special permit from the Secretary of Agriculture: *Provided*, That nothing in this section shall restrict the importation of natural history specimens for museums or scientific collections, or of certain cage birds, such as domesticated canaries, parrots, or such other birds as the Secretary of Agriculture may designate. The Secretary of the Treasury is hereby authorized to make regulations for carrying into effect the provisions of this section.

SEC. 242. It shall be unlawful for any person to deliver to any common carrier for transportation, or for any common carrier to transport from any State, Territory, or District of the United States, to any other State, Territory, or District thereof, any foreign animals or birds, the importation of which is prohibited, or the dead bodies or parts thereof of any wild animals or birds, where such animals or birds have been killed or shipped in violation of the laws of the State, Territory, or District in which the same were killed, or from which they were shipped: *Provided*, That nothing herein shall prevent the transportation of any dead birds or animals killed during the season when the same may be lawfully captured, and the export of which is not prohibited by law in the State, Territory, or District in which the same are captured or killed: *Provided further*, That nothing herein shall prevent the importation, transportation, or sale of birds or bird plumage manufactured from the feathers of barnyard fowls.

SEC. 243. All packages containing the dead bodies, or the plumage, or parts thereof, of game animals, or game or other wild birds, when shipped in interstate or foreign commerce, shall be plainly and clearly marked, so that the name and address of the shipper, and the nature of the contents, may be readily ascertained on an inspection of the outside of such package.

SEC. 244. For each evasion or violation of any provision of the three sections last preceding, the shipper shall be fined not more than two hundred dollars; the consignee knowingly receiving such articles so shipped and transported in violation of said sections shall be fined not more than two hundred dollars; and the carrier knowingly carrying or transporting the same in violation of said sections shall be fined not more than two hundred dollars.

1910—Act of April 21, 1910 (36 Stat. L., 326, 327)—An Act To protect the seal fisheries of Alaska, and for other purposes.

* * * *

SEC. 4. That section nineteen hundred and fifty-six of the Revised Statutes of the United States and section one hundred and seventy-three of the Act of March third, eighteen hundred and ninety-nine [30 Stat. L., 1279] be amended to read as follows:

"No person shall kill any otter, mink, marten, sable, or fur seal, or other fur-bearing animal, within the limits of Alaska Territory or in the waters thereof; and every person guilty thereof shall, for each offense, be fined not less than two hundred nor more than one thousand dollars or imprisoned not more than six months, or both; and all vessels, their tackle, apparel, furniture, and cargo found engaged in violation of this section shall be forfeited; but the Secretary of Commerce and Labor [Agriculture]¹⁵ shall have power to authorize the killing of any such mink, marten, sable, fur seal, or other fur-bearing animal under such regulations as he may prescribe; and it shall be the duty of the Secretary of Commerce and Labor [Agriculture]¹⁶ to prevent the killing of any fur seal except as authorized by law and to provide for the execution of the provisions of this section until it is otherwise provided by law."

1910—Act of May 26, 1910 (36 Stat. L., 416, 434)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and eleven.

* * * *

For the enforcement of sections two hundred and forty-one, two hundred and forty-two, two hundred and forty-three, and two hundred and forty-four of the Act approved March fourth, nineteen hundred and nine, entitled "An Act to codify, revise, and amend the penal laws of the United States," and for the enforcement of section one of the Act approved May twenty-fifth, nineteen hundred, entitled "An Act to enlarge the powers of the Department of Agriculture, prohibit the transportation by interstate commerce of game killed in violation of local laws, and for other purposes," nine thousand four hundred and twenty dollars;

For the maintenance of the Montana National Bison Range and other reservations for mammals and birds, and for the enforcement of section eighty-four of the Act approved March fourth, nineteen hundred and nine, entitled "An Act to codify, revise, and amend the penal laws of the United States," seven thousand dollars; . . .

1911—Act of March 4, 1911 (36 Stat. L., 1235, 1257, 1258)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and twelve.

* * * *

For the feeding, protecting, and removal of elk in the country known as Jackson's Hole and vicinity, in the State of Wyoming, twenty thousand dollars, to become immediately available, and remain available until expended; . . .

¹⁶ Act of May 31, 1920; 41 Stat. L., 694, 716.

1912—Act of August 10, 1912 (37 Stat. L., 269, 293)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and thirteen.

* * * *

For the establishment of a national game preserve, to be known as the Wind Cave National Game Preserve, upon the land embraced within the boundaries of the Wind Cave National Park, in the State of South Dakota, for a permanent national range for a herd of buffalo to be presented to the United States by the American Bison Society, and for such other native American game animals as may be placed therein. The Secretary of Agriculture is authorized to acquire by purchase or condemnation such adjacent lands as may be necessary for the purpose of assuring an adequate, permanent water supply, and to enclose the said game preserve with a good and substantial fence and to erect thereon all necessary sheds and buildings for the proper care and maintenance of the said animals, twenty-six thousand dollars, to be available until expended;

. . . and for investigations and experiments in connection with rearing of fur-bearing animals, including mink and marten, forty-three thousand dollars, of which sum three thousand dollars shall be used for the destruction of ground squirrels on the national forests of California;¹⁷ . . .

* * * *

For the establishment of a winter game (elk) reserve in the State of Wyoming, which shall be located in that section of Wyoming lying south of the Yellowstone Park, and shall include not less than two thousand acres in township forty-one north, ranges one hundred and fifteen and one hundred and sixteen west, forty-five thousand dollars, to be available until expended, and the Secretary of Agriculture is hereby authorized to purchase said lands with improvements, to erect necessary buildings and inclosures, and to incur other expenses necessary for the maintenance of the reserve; . . .

1912—Act of August 24, 1912 (37 Stat. L., 512)—An Act To create a legislative assembly in the Territory of Alaska, to confer legislative power thereon, and for other purposes.

* * * *

SEC. 3. Constitution and Laws of United States Extended.— . . . *Provided*, That the authority herein granted to the legislature to alter, amend, modify, and repeal laws in force in Alaska shall not extend . . . to the game, fish, and fur-seal laws and laws relating to fur-bearing animals of the United States applicable to Alaska, . . .

1913—Act of March 4, 1913 (37 Stat. L., 828, 846, 847, 848)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and fourteen.

* * * *

¹⁷ Attached to food habits clause. See act of March 4, 1909 (35 Stat. L., 1039, 1051, 1052).

BUREAU OF BIOLOGICAL SURVEY

* * * *

For the establishment and maintenance of a winter elk refuge in the State of Wyoming, \$5,000, to be available until expended, and the Secretary of Agriculture is hereby authorized to include in said refuge and to inclose not more than one thousand acres of unoccupied public lands, which when selected shall be made to conform to the lines of the public surveys, and shall be adjacent to or partly inclosed by said refuge;

For investigating the food habits of North American birds and mammals . . . of which sum \$15,000 shall be used for the destruction of ground squirrel on the national forests;

* * * *

All wild geese, wild swans, brant, wild ducks, snipe, plover, woodcock, rail, wild pigeons, and all other migratory game and insectivorous birds which in their northern and southern migrations pass through or do not remain permanently the entire year within the borders or any State or Territory, shall hereafter be deemed to be within the custody and protection of the Government of the United States, and shall not be destroyed or taken contrary to regulations hereinafter provided therefor.

The Department of Agriculture is hereby authorized and directed to adopt suitable regulations to give effect to the previous paragraph by prescribing and fixing closed seasons, having due regard to the zones of temperature, breeding habits, and times and line of migratory flight, thereby enabling the department to select and designate suitable districts for different portions of the country, and it shall be unlawful to shoot or by any device kill or seize and capture migratory birds within the protection of this law during said closed seasons, and any person who shall violate any of the provisions or regulations of this law for the protection of migratory birds shall be guilty of a misdemeanor and shall be fined not more than \$100 or imprisoned not more than ninety days, or both, in the discretion of the court.

The Department of Agriculture, after the preparation of said regulations, shall cause the same to be made public, and shall allow a period of three months in which said regulations may be examined and considered before final adoption, permitting, when deemed proper, public hearings thereon, and after final adoption shall cause the same to be engrossed and submitted to the President of the United States for approval: *Provided, however,* That nothing herein contained shall be deemed to affect or interfere with the local laws of the States and Territories for the protection of nonmigratory game or other birds resident and breeding within their borders, nor to prevent the States and Territories from enacting laws and regulations to promote and render efficient the regulations of the Department of Agriculture provided under this statute.

1913—Act of October 3, 1913 (38 Stat. L., 114, 148)—An Act To reduce tariff duties and to provide revenue for the Government, and for other purposes.

* * * *

SCHEDULE N—SUNDRIES

* * * *

. . . *Provided*, That the importation of aigrettes, egret plumes, or so-called osprey plumes, and the feathers, quills, heads, wings, tails, skins, or parts of skins, or wild birds, either raw or manufactured, and not for scientific or educational purposes, is hereby prohibited; but this provision shall not apply to the feathers or plumes of ostriches, or to the feathers or plumes of domestic fowls of any kind.¹⁸

1914—Act of June 30, 1914 (38 Stat. L., 415, 433, 434, 435)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and fifteen.

* * * *

For investigating the food habits of North American birds and mammals . . . including experiments and demonstrations in destroying wolves, prairie dogs, and other animals injurious to agriculture and animal husbandry,¹⁹ . . . \$115,000: . . . *And provided further*, That of this sum not more than \$5,000 may be used in investigating the disease of wild ducks in the Salt Lake Valley region of Utah;

* * * *

For the improvement of a game preserve in Sullys Hill National Park, in the State of North Dakota, \$5,000, the same to be available until expended. The Secretary of Agriculture is authorized to inclose the said park with a good and substantial fence, to construct thereon all sheds, buildings, and corrals necessary for the proper care and maintenance of the animals and birds therein, to erect a suitable headquarters, to construct and maintain roads, trails, and other structures necessary for the convenience of visitors, and to incur such other expenses as may be necessary for the proper maintenance of the preserve and the animals and birds placed therein. The Secretary of Agriculture is also authorized to place in the park buffalos, elk, deer, and such other wild or rare animals and birds as he may in his discretion decide.

* * * *

For all necessary expenses for enforcing the provisions of the Act approved March fourth, nineteen hundred and thirteen (Thirty-seventh Statutes at Large, pages eight hundred and forty-seven and eight hundred and forty-eight), relating to the protection of migratory game and insectivorous birds, \$50,000; . . .

1915—Act of March 4, 1915 (38 Stat. L., 1086, 1104, 1105)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and sixteen.

* * * *

¹⁸ See act of September 21, 1922 (42 Stat. L., 858, 915, 916).

¹⁹ Previously referred to as noxious animals, see act March 4, 1909 (35 Stat. L., 1039, 1051, 1052).

BUREAU OF BIOLOGICAL SURVEY

* * * *

For the enforcement of sections two hundred and forty-one, two hundred and forty-two, two hundred and forty-three, and two hundred and forty-four of the Act approved March fourth, nineteen hundred and nine, . . . including all necessary investigations in connection therewith, \$16,000; ²⁰ . . .

* * * *

For investigating the food habits of North American birds and mammals . . . *And provided also*, That of this sum not less than \$125,000 shall be used on the National forests and the public domain in destroying wolves, coyotes, and other animals injurious to agriculture and animal husbandry; ²¹ . . .

* * * *

. . . and for cooperation with local authorities in the protection of migratory birds, and for necessary investigations connected therewith, \$50,000; ²² . . .

1916—Act of February 28, 1916 (39 Stat. L., 14, 24, 25)—An Act Making appropriations to supply further urgent deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and sixteen, and prior years, and for other purposes.

* * * *

BUREAU OF BIOLOGICAL SURVEY

To meet the emergency caused by the prevalence and continued spread of rabies in wolves, coyotes, and other predatory wild animals, which is being communicated by them to stock and other domestic animals, on the public lands, national forests, and elsewhere, in the Western and Northwestern States, by the destruction of such wild animals, \$75,000; and the Secretary of Agriculture is authorized to incur such expense and to employ such persons and means, as, in his judgment, may be necessary to enable him to carry out the purposes of this appropriation.

1916—Act of August 11, 1916 (39 Stat. L., 446, 466, 467)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for other purposes.

* * * *

²⁰ Investigations first provided for.

²¹ First big predatory appropriation.

²² Attached to paragraph providing for enforcement of Migratory Bird Act of 1913.

BUREAU OF BIOLOGICAL SURVEY

* * * *

... *And provided also*, That of this sum not less than \$125,000 shall be used on the national forests and the public domain in destroying wolves, coyotes, and other animals injurious to agriculture and animal husbandry: *And provided further*, That of this sum not more than \$125,000 shall be used on the public lands, national forests, and elsewhere in the Western and Northwestern States for the protection of stock and other domestic animals through the suppression of rabies by the destruction of wolves, coyotes, and other predatory wild animals.²³

1916—Convention of August 16, 1916 (39 Stat. L., 1702)—Convention Between The United States and Great Britain for the protection of migratory birds in the United States and Canada.²⁴

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA
A PROCLAMATION

Whereas a convention between the United States of America and the United Kingdom of Great Britain and Ireland for the protection of migratory birds in the United States and Canada was concluded and signed by their respective plenipotentiaries at Washington on the 16th day of August, 1916, the original of which convention is word for word as follows:

Whereas, many species of birds in the course of their annual migrations traverse certain parts of the United States and the Dominion of Canada; and

Whereas, many of these species are of great value as a source of food or in destroying insects which are injurious to forests and forage plants on the public domain, as well as to agricultural crops, in both the United States and Canada, but are nevertheless in danger of extermination through lack of adequate protection during the nesting season or while on their way to and from their breeding grounds;

²³ From food habits clause, the total appropriation for which was \$400,540. Note the contrast in the restrictions placed upon the predatory and rabies appropriations.

²⁴ Signed at Washington Aug. 16, 1916; ratification advised by the Senate Aug. 29, ratified by the President Sept. 1, and by Great Britain Oct. 20; ratifications exchanged Dec. 7; proclaimed Dec. 8, 1916. Constitutionality of the treaty and act of July 3, 1918, sustained by the United States Supreme Court in a decision rendered Apr. 19, 1920, in the case of the State of Missouri, *v.* Ray P. Holland (252 U. S. 416); see also U. S. *v.* Lumpkin (276 Fed. 580).

Canada, by an act of Parliament approved Aug. 29, 1917, gave full effect to this convention and promulgated regulations thereunder May 11, 1918. The validity of the act of the Dominion Parliament was upheld by the Supreme Court of Prince Edward Island in a decision (Michaelmas term, 1920) rendered in the case of *The King v. Russell C. Clark*. For full text of the Canadian migratory-bird treaty act and regulations, communicate with the Commissioner of Canadian National Parks, Ottawa, Ontario.

The United States of America and His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, being desirous of saving from indiscriminate slaughter and of insuring the preservation of such migratory birds as are either useful to man or harmless, have resolved to adopt some uniform system of protection which shall effectively accomplish such objects and to the end of concluding a convention for this purpose have appointed as their respective plenipotentiaries:

The President of the United States of America, Robert Lansing, Secretary of State of the United States; and

His Britannic Majesty, the Right Hon. Sir Cecil Arthur Spring Rice, G. C. V. O., K. C. M. G., etc., His Majesty's ambassador extraordinary and plenipotentiary at Washington;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and adopted the following articles:

ARTICLE I

The high contracting powers declare that the migratory birds included in the terms of this convention shall be as follows:

1. Migratory game birds:

(a) Anatidae or waterfowl, including brant, wild ducks, and swans.

(b) Gruidae or cranes, including little brown, sandhill, and whooping cranes.

(c) Rallidae or rails, including coots, gallinules and sora and other rails.

(d) Limicolae or shore birds, including avocets, curlew, dowitchers, godwits, knots, oyster catchers, phalaropes, plovers, sandpipers, snipe, stilts, surf birds, turnstones, willet, woodcock and yellowlegs.

(e) Columbidae or pigeons, including doves and wild pigeons.

2. Migratory insectivorous birds: Bobolinks, catbirds, chickadees, cuckoos, flickers, flycatchers, grosbeaks, humming birds, kinglets, martins, meadowlarks, nighthawks or bull bats, nut-hatches, orioles, robins, shrikes, swallows, swifts, tanagers, titmice, thrushes, vireos, warblers, wax-wings, whippoorwills, woodpeckers, and wrens, and all other perching birds which feed entirely or chiefly on insects.

3. Other migratory nongame birds: Auks, auklets, bitterns, fulmars, gannets, grebes, guillemots, gulls, herons, jaegers, loons, murre, petrels, puffins, shearwaters, and terns.

ARTICLE II

The high contracting powers agree that, as an effective means of preserving migratory birds there shall be established the following close seasons during which no hunting shall be done except for scientific or propagating purposes under permits issued by proper authorities.

1. The close season on migratory game birds shall be between March 10 and September 1, except that the close season on the Limicolae or shorebirds in the Maritime Provinces of Canada and in those States of the United States bordering on the Atlantic Ocean which are situated wholly or in part north of Chesapeake Bay shall be between February 1 and August 15, and that Indians may take at any time scoters for food but not for sale. The

season for hunting shall be further restricted to such period not exceeding three and one-half months as the high contracting powers may severally deem appropriate and define by law or regulation.

2. The close season on migratory insectivorous birds shall continue throughout the year.

3. The close season on other migratory nongame birds shall continue throughout the year, except that Eskimos and Indians may take at any season auks, auklets, guillemots, murres, and puffins, and their eggs, for food and their skins for clothing, but the birds and eggs so taken shall not be sold or offered for sale.

ARTICLE III

The high contracting powers agree that during the period of 10 years next following the going into effect of this convention there shall be a continuous close season on the following migratory game birds, to wit:

Band-tailed pigeons, little brown, sandhill, and whooping cranes, swans, curlew, and all shorebirds (except the black-breasted and golden plover, Wilson or jack snipe, woodcock, and the greater and lesser yellowlegs); provided that during such 10 years the close seasons on cranes, swans, and curlew in the Province of British Columbia shall be made by the proper authorities of that Province within the general dates and limitations elsewhere prescribed in this convention for the respective groups to which these birds belong.

ARTICLE IV

The high contracting powers agree that special protection shall be given the wood duck and the eider duck either (1) by a close season extending over a period of at least 5 years, or (2) by the establishment of refuges, or (3) by such other regulations as may be deemed appropriate.

ARTICLE V

The taking of nests or eggs of migratory game or insectivorous or non-game birds shall be prohibited, except for scientific or propagating purposes under such laws or regulations as the high contracting powers may severally deem appropriate.

ARTICLE VI

The high contracting powers agree that the shipment or export of migratory birds or their eggs from any State or Province, during the continuance of the close season in such State or Province, shall be prohibited except for scientific or propagating purposes, and the international traffic in any birds or eggs at such time captured, killed, taken, or shipped at any time contrary to the laws of the State or Province in which the same were captured, killed, taken, or shipped shall be likewise prohibited. Every package containing migratory birds or any parts thereof or any eggs of migratory birds transported, or offered for transportation from the United States into the Dominion of Canada or from the Dominion of Canada into the United States, shall have the name and address of the shipper and an accurate statement of the contents clearly marked on the outside of such package.

ARTICLE VII

Permits to kill any of the above-named birds which under extraordinary conditions may become seriously injurious to the agricultural or other interests in any particular community, may be issued by the proper authorities of the high contracting powers under suitable regulations prescribed therefor by them, respectively, but such permits shall lapse or may be canceled at any time when, in the opinion of said authorities, the particular exigency has passed, and no birds killed under this article shall be shipped, sold, or offered for sale.

ARTICLE VIII

The high contracting powers agree themselves to take, or propose to their respective appropriate law-making bodies, the necessary measures for insuring the execution of the present convention.

ARTICLE IX

The present convention shall be ratified by the President of the United States of America, by and with the advice and consent of the Senate thereof, and by His Britannic Majesty. The ratifications shall be exchanged at Washington as soon as possible and the convention shall take effect on the date of the exchange of the ratifications. It shall remain in force for 15 years and in the event of neither of the high contracting powers having given notification 12 months before the expiration of said period of 15 years of its intention of terminating its operation, the convention shall continue to remain in force for 1 year and so on from year to year.

In faith whereof, the respective plenipotentiaries have signed the present convention in duplicate and have hereunto affixed their seals.

Done at Washington this 16th day of August, 1916.

[SEAL.]

ROBERT LANSING.

[SEAL.]

CECIL SPRING RICE.

And whereas the said convention has been duly ratified on both parts, and the ratifications of the two Governments were exchanged in the city of Washington on the 7th day of December, 1916:

Now, therefore, be it known that I, WOODROW WILSON, President of the United States of America, have caused the said convention to be made public, to the end that the same and every article and clause thereof may be observed and fulfilled with good faith by the United States and the citizens thereof.

In testimony whereof, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington this 8th day of December in the year of our Lord 1916, and of the independence of the United States of America the 141st.

[SEAL.]

WOODROW WILSON

By the President:

ROBERT LANSING,

Secretary of State.

1918—Act of July 3, 1918 (40 Stat. L., 755)—An Act To give effect to the convention between the United States and Great Britain for the protection of migratory birds con-

cluded at Washington, August sixteenth, nineteen hundred and sixteen, and for other purposes.

[SECTION 1]. That this Act shall be known by the short title of the "Migratory Bird Treaty Act."

SEC. 2. That unless and except as permitted by regulations made as hereinafter provided, it shall be unlawful to hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time or in any manner, any migratory bird, included in the terms of the convention between the United States and Great Britain for the protection of migratory birds concluded August sixteenth, nineteen hundred and sixteen, or any part, nest, or egg of any such bird.

SEC. 3. That subject to the provisions and in order to carry out the purposes of the convention, the Secretary of Agriculture is authorized and directed, from time to time, having due regard to the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President.

SEC. 4. That it shall be unlawful to ship, transport, or carry, by any means whatever, from one State, Territory, or District to or through another State, Territory, or District to or through a foreign country, any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried at any time contrary to the laws of the State, Territory, or District in which it was captured, killed, or taken, or from which it was shipped, transported, or carried. It shall be unlawful to import any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried contrary to the laws of any Province of the Dominion of Canada in which the same was captured, killed, or taken, or from which it was shipped, transported, or carried.

SEC. 5. That any employee of the Department of Agriculture authorized by the Secretary of Agriculture to enforce the provisions of this Act shall have power, without warrant, to arrest any person committing a violation of this Act in his presence or view and to take such person immediately for examination or trial before an officer or court of competent jurisdiction; shall have power to execute any warrant or other process issued by an officer or court of competent jurisdiction for the enforcement of the provisions of this Act; and shall have authority, with a search warrant, to search any place. The several judges of the courts established under the laws of the United States, and United States commissioners may, within their respective jurisdictions, upon proper oath or affirmation showing probable cause, issue warrants in all such cases. All birds, or parts, nests, or eggs thereof, captured, killed, taken, shipped, transported, carried or possessed contrary to the provisions of this Act or of any regulations made pursuant thereto shall, when found, be seized by any such employee, or by any

marshal or deputy marshal, and, upon conviction of the offender or upon judgment of a court of the United States that the same were captured, killed, taken, shipped, transported, carried, or possessed contrary to the provisions of this Act or of any regulations made pursuant thereto, shall be forfeited to the United States and disposed of as directed by the court having jurisdiction.

SEC. 6. That any person, association, partnership, or corporation who shall violate any of the provisions of said convention or of this Act, or who shall violate or fail to comply with any regulation made pursuant to this Act, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not more than \$500 or be imprisoned not more than six months, or both.

SEC. 7. That nothing in this Act shall be construed to prevent the several States and Territories from making or enforcing laws or regulations not inconsistent with the provisions of said convention or of this Act, or from making or enforcing laws or regulations which shall give further protection to migratory birds, their nests, and eggs, if such laws or regulations do not extend the open seasons for such birds beyond the dates approved by the President in accordance with section three of this Act.

SEC. 8. That until the adoption and approval, pursuant to section three of this Act, of regulations dealing with migratory birds and their nests and eggs, such migratory birds and their nests and eggs as are intended and used exclusively for scientific or propagating purposes may be taken, captured, killed, possessed, sold, or purchased, shipped and transported for such scientific or propagating purposes if and to the extent not in conflict with the laws of the State, Territory, or District in which they are taken, captured, killed, possessed, sold, or purchased, or in or from which they are shipped or transported if the packages containing the dead bodies or the nests or eggs of such birds when shipped and transported shall be marked on the outside thereof so as accurately and clearly to show the name and address of the shipper and the contents of the package.

SEC. 9. That the unexpended balances of any sums appropriated by the agricultural appropriations Acts for the fiscal years nineteen hundred and seventeen and nineteen hundred and eighteen, for enforcing the provisions of the Act approved March fourth, nineteen hundred and thirteen, relating to the protection of migratory game and insectivorous birds, are hereby reappropriated and made available until expended for the expenses of carrying into effect the provisions of this Act and regulations made pursuant thereto, including the payment of such rent, and the employment of such persons and means, as the Secretary of Agriculture may deem necessary, in the District of Columbia and elsewhere, coöperation with local authorities in the protection of migratory birds, and necessary investigations connected therewith: *Provided*, That no person who is subject to the draft for service in the Army or Navy shall be exempted or excused from such service by reason of his employment under this Act.

SEC. 10. That if any clause, sentence, paragraph, or part of this Act shall, for any reason, be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect, impair, or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, or part thereof directly involved in the controversy in which such judgment shall have been rendered.

SEC. 11. That all Acts or parts of Acts inconsistent with the provisions of this Act are hereby repealed.

SEC. 12. Nothing in this Act shall be construed to prevent the breeding of migratory game birds on farms and preserves and the sale of birds so bred under proper regulations for the purpose of increasing the food supply.

SEC. 13. That this Act shall become effective immediately upon its passage and approval.

1918—Act of November 1, 1918 (40 Stat. L., 973, 994, 995, 996)—
An Act Making appropriations for the Department of
Agriculture for the fiscal year ending June thirtieth,
nineteen hundred and nineteen.

* * * *

BUREAU OF BIOLOGICAL SURVEY

* * * *

For all necessary expenses for enforcing the provisions of the Act approved March fourth, nineteen hundred and thirteen (Thirty-seventh Statutes at Large, pages eight hundred and forty-seven and eight hundred and forty-eight), relating to the protection of migratory game and insectivorous [*sic*] birds, and any Act of Congress to give effect to the treaty with Great Britain relating to migratory birds, and for coöperation with local authorities in the protection of migratory birds, and for necessary investigations connected therewith, \$50,000; . . .

1919—Act of July 24, 1919 (41 Stat. L., 234, 257, 258, 270)—An
Act Making appropriations for the Department of Agri-
culture for the fiscal year ending June 30, 1920.

* * * *

BUREAU OF BIOLOGICAL SURVEY

* * * *

For all necessary expenses for enforcing the provisions of the migratory-bird treaty act of July 3, 1918 (Public, Numbered 186, Sixty-fifth Congress), and for coöperation with local authorities in the protection of migratory birds, and for necessary investigations connected therewith, \$147,000: *Provided*, That of this sum not more than \$22,000 may be used for the enforcement of sections 241, 242, 243, and 244 of the Act approved March 4, 1909, entitled "An Act to codify, revise, and amend the penal laws of the United States," and for the enforcement of section 1 of the Act approved May 25, 1900, entitled "An Act to enlarge the powers of the Department of Agriculture, prohibit the transportation by interstate commerce of game killed in violation of local laws, and for other purposes," including all necessary investigations in connection therewith; . . .

* * * *

That hereafter the Secretary of Agriculture may, in his discretion and under such conditions as he may prescribe, supply to any municipality or public institution not more than one American bison from any surplus which may exist in any herd under the control of the Department of Agriculture; and, in order to aid in the propagation of the species, animals may be loaned to or exchanged with other owners of American bison.

1920—Act of May 31, 1920 (41 Stat. L., 694, 715, 716, 717)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1921.

* * * *

BUREAU OF BIOLOGICAL SURVEY

* * * *

For investigating the food habits of North American birds and other animals in relation to agriculture, horticulture, and forestry; for investigations, experiments, and demonstrations in connection with rearing fur-bearing animals; for experiments, demonstrations, and coöperation in destroying wolves, coyotes, prairie dogs, gophers, ground squirrels,²⁵ and other animals injurious to agriculture, horticulture, forestry, animal husbandry, and wild game; and for the protection of stock and other domestic animals through the suppression of rabies in predatory wild animals, \$456,040;²⁶ . . .

* * * *

For investigations, experiments and demonstrations for the welfare, improvement, and increase of the reindeer industry in Alaska, including the erection of necessary buildings and other structures and coöperation with the Bureau of Education, and for the enforcement of section 1956 of the Revised Statutes as amended so far as it relates to the protection of land fur-bearing animals in Alaska, including necessary investigations in connection therewith, \$40,000; . . .

* * * *

Hereafter the powers and duties heretofore conferred upon the Secretary of Commerce by existing law, proclamation, or Executive orders with respect to any minx, marten, beaver, land otter, muskrat, fox, wolf, wolverine, weasel, or other land fur-bearing animals in Alaska, and with respect to the leasing of certain islands in Alaska for the propagation of fur-bearing animals, are hereby conferred upon, and shall be exercised by, the Secretary of Agriculture, and the powers and duties conferred upon the Secretary of Agriculture by existing law, with respect to walruses and sea lions, are hereby conferred upon, and shall be exercised by, the Secretary of Commerce: *Provided*, That nothing in this Act shall affect the powers and duties conferred upon the Secretary of Commerce by existing law, proclamations, or Executive orders with respect to fur seals and sea otters, and jurisdiction over the Pribiloff Islands and the fur-bearing animals thereon: and hereafter the wardens and other officers heretofore or hereafter appointed by the Secretary of Agriculture for the protection of bird reservations in Alaska under control of the Department of Agriculture, or for the protection of fur-bearing animals in Alaska, shall have and exercise like authority and powers in the performance of their respective

²⁵ Mountain lions, bob cats, and jack rabbits added in next year's act (41 Stat. L., 1315, 1335). In all other respects precisely like each corresponding clause in each subsequent appropriation act.

²⁶ A simplification of the food habits, paragraphs of preceding years. Same things provided for, but no restrictions as to areas to be worked in or amounts to be expended for specific purposes.

duties as are conferred upon game wardens by the Alaska game law of May 11, 1908 (Thirty-fifth Statutes at Large, page 102), and by existing law upon officers and agents of the Department of Commerce employed in the salmon fisheries and fur-seal and sea-otter services in Alaska; . . .

1922—Act of September 21, 1922 (42 Stat. L., 858, 915, 916)—

An Act To provide revenue, to regulate commerce with foreign countries, to encourage the industries of the United States, and for other purposes.

* * * *

SCHEDULE 14.—SUNDRIES

* * * *

Paragraph 1419 . . . *Provided*, That the importation of birds of paradise, aigrettes, egret plumes or so-called osprey plumes, and the feathers, quills, heads, wings, tails, skins, or parts of skins, of wild birds, either raw or manufactured, and not for scientific or educational purposes, is hereby prohibited; but this provision shall not apply to the feathers or plumes of ostriches or to the feathers or plumes of domestic fowls of any kind: *Provided further*, That birds of paradise, and the feathers, quills, heads, wings, tails, skins, or parts thereof, and all aigrettes, egret plumes, or so-called osprey plumes, and the feathers, quills, heads, wings, tails, skins, or parts of skins, of wild birds, either raw or manufactured, of like kind to those the importation of which is prohibited by the foregoing provisions of this paragraph, which may be found in the United States, on and after the passage of this Act, except as to such plumage or parts of birds in actual use for personal adornment, and except such plumage, birds or parts thereof imported therein for scientific or educational purposes, shall be presumed for the purpose of seizure to have been imported unlawfully after October 3, 1913, and the collector of customs shall seize the same unless the possessor thereof shall establish, to the satisfaction of the collector that the same were imported into the United States prior to October 3, 1913, or as to such plumage or parts of birds that they were plucked or derived in the United States from birds lawfully therein; and in case of seizure by the collector, he shall proceed as in case of forfeiture for violation of the customs laws, and the same shall be forfeited, unless the claimant shall, in any legal proceeding to enforce such forfeiture, other than a criminal prosecution, overcome the presumption of illegal importation and establish that the birds or articles seized, of like kind to those mentioned the importation of which is prohibited as above, were imported into the United States prior to October 3, 1913, or were plucked in the United States from birds lawfully therein.

That whenever birds or plumage, the importation of which is prohibited by the foregoing provisions of this paragraph, are forfeited to the Government, the Secretary of the Treasury is hereby authorized to place the same with the departments or bureaus of the Federal or State Governments or societies or museums for exhibition or scientific or educational purposes, but not for sale or personal use; and in the event of such birds or plumage not being required or desired by either Federal or State Government or for educational purposes, they shall be destroyed.

That nothing in this Act shall be construed to repeal the provisions of the Act of March 4, 1913, chapter 145 (Thirty-seventh Statutes at Large, page 847), or the Act of July 3, 1918 (Fortieth Statutes at Large, page 755), or any other law of the United States, now of force, intended for the protection or preservation of birds within the United States. That if on investigation by the collector before seizure, or before trial for forfeiture, or if at such trial if such seizure has been made, it shall be made to appear to the collector, or the prosecuting officer of the Government, as the case may be, that no illegal importation of such feathers has been made, but that the possession, acquisition or purchase of such feathers is or has been made in violation of the provisions of the Act of March 4, 1913, chapter 145 (Thirty-seventh Statutes at Large, page 847), or the Act of July 3, 1918 (Fortieth Statutes at Large, page 755), or any other law of the United States, now of force, intended for the protection or preservation of birds within the United States, it shall be the duty of the collector, or such prosecuting officer, as the case may be, report the facts to the proper officials of the United States, or State or Territory charged with the duty of enforcing such laws.²⁷

1924—Act of April 15, 1924 (43 Stat. L., 98)—An Act To amend section 84 of the Penal Code of the United States.

[SECTION 1]. That section 84 of the Act entitled "An Act to codify, revise, and amend the penal laws of the United States," approved March 4, 1909 (Thirty-fourth Statutes, page 1088), be, and the same is hereby, amended so as to read as follows:

"SEC. 84. Whoever shall hunt, trap, capture, willfully disturb, or kill any bird or wild animal of any kind whatever, or take or destroy the eggs of any such bird on any lands of the United States which have been set apart or reserved as refuges or breeding grounds for such birds or animals by any law, or Executive order, except under such rules and regulations as the Secretary of Agriculture may, from time to time, prescribe, or who shall willfully injure, molest, or destroy any property of the United States on any such lands shall be fined not more than \$500, or imprisoned not more than six months, or both."²⁸

1924—Act of June 7, 1924 (43 Stat. L., 650, 651, 652)—An Act to establish the Upper Mississippi River Wild Life and Fish Refuge.

[SECTION 1]. That this Act may be cited as "The Upper Mississippi River Wild Life and Fish Refuge Act."

SEC. 2. The Secretary of Agriculture is authorized and directed to acquire by purchase, gift, or lease, such areas of land, or of land and water situated between Rock Island, Illinois, and Wabasha, Minnesota, on either side of or upon islands in the Mississippi River which are subject to overflow by such river and which are not used for agricultural purposes, as he determines suitable for the purposes of this Act.

²⁷ See act of October 3, 1913 (38 Stat. L., 114, 148).

²⁸ See acts of June 28, 1906 (34 Stat. L., 536), and March 4, 1909 (35 Stat. L., 1088, 1137, 1138).

SEC. 3. Any such area, when acquired in accordance with the provisions of this Act, shall become a part of the Upper Mississippi River Wild Life and Fish Refuge (hereinafter in this Act referred to as the "refuge"). The refuge shall be established and maintained (a) as a refuge and breeding place for migratory birds included in the terms of the convention between the United States and Great Britain for the protection of migratory birds, concluded August 16, 1916, and (b) to such extent as the Secretary of Agriculture may by regulations prescribe, as a refuge and breeding place for other wild birds, game animals, fur-bearing animals, and for the conservation of wild flowers and aquatic plants, and (c) to such extent as the Secretary of Commerce may by regulations prescribe as a refuge and breeding place for fish and other aquatic animal life.

SEC. 4. (a) No such area shall be acquired by the Secretary of Agriculture until the legislature of each State in which is situated any part of the areas to be acquired under this Act has consented to the acquisition of such part by the United States for the purposes of this Act, and, except in the case of a lease, no payment shall be made by the United States for any such area until title thereto is satisfactory to the Attorney General and is vested in the United States.

(b) The existence of a right of way, easement, or other reservation or exception in respect of such area shall not be a bar to its acquisition (1) if the Secretary of Agriculture determines that any such reservation or exception will in no manner interfere with the use of the area for the purposes of this Act, or (2) if in the deed or other conveyance it is stipulated that any reservation or exception in respect of such area, in favor of the person from whom the United States receives title, shall be subject to regulations prescribed under authority of this Act.

SEC. 5. Except where it is specifically provided otherwise, the Secretary of Agriculture and the Secretary of Commerce shall jointly prescribe such regulations, exercise such functions, and perform such duties as may be necessary to carry out the purposes of this Act.

SEC. 6. No person shall, except in accordance with regulations prescribed by the Secretary of Agriculture in respect of wild birds, game animals, fur-bearing animals, wild flowers, and aquatic plants, or by the Secretary of Commerce in respect of fish and other aquatic-animal life—

(a) Enter the refuge for any purpose; or

(b) Disturb, injure, kill, or remove, or attempt to disturb, injure, kill, or remove any wild bird, game animal, fur-bearing animal, fish or other aquatic-animal life on the refuge; or

(c) Remove from the refuge, or injure or destroy thereon any flower, plant, tree, or other natural growth, or the nest or egg of any wild bird; or

(d) Injure or destroy any notice, sign board, fence, building, or other property of the United States thereon.

SEC. 7. Commercial fishing may be conducted in the waters of this refuge under regulation by the Secretary of Commerce.

SEC. 8. (a) Any employee of the Department of Agriculture authorized by the Secretary of Agriculture to enforce the provisions of this Act, and any employee of the Department of Commerce so authorized by the Secretary of Commerce (1) shall have power, without warrant, to arrest any person committing in the presence of such employee a violation of this Act or of any regulation made pursuant to this Act, and to take such person immedi-

ately for examination or trial before an officer or court of competent jurisdiction, (2) shall have power to execute any warrant or other process issued by an officer or court of competent jurisdiction to enforce the provisions of this Act or regulations made pursuant thereto, and (3) shall have authority, with a search warrant issued by an officer or court of competent jurisdiction to make a search in accordance with the terms of such warrant. Any judge of a court established under the laws of the United States, or any United States commissioner may, within his respective jurisdiction, upon proper oath or affirmation showing probable cause, issue warrants in all such cases.

(b) All birds, animals, fish, or parts thereof captured, injured, or killed, and all flowers, plants, trees, and other natural growths, and nests and eggs of birds removed, and all implements or paraphernalia, including guns, fishing equipment, and boats used or attempted to be used contrary to the provisions of this Act or any regulations made pursuant thereto, shall, when found by such employee or by any marshal or deputy marshal, be summarily seized by him and placed in the custody of such persons as the Secretary of Agriculture and the Secretary of Commerce may jointly by regulation prescribe.

(c) A report of the seizure shall be made to the United States attorney for the judicial district in which the seizure is made, for forfeiture either (1) upon conviction of the offender under section 11, or (2) by proceedings by libel *in rem*. Such libel proceedings shall conform as near as may be to civil suits in admiralty, except that either party may demand trial by jury upon any issue of fact when the value in controversy exceeds \$20. In case of a jury trial the verdict of the jury shall have the same effect as the finding of the court upon the facts. Libel proceedings shall be at the suit and in the name of the United States. If such forfeiture proceedings are not instituted within a reasonable time, the United States attorney shall give notice thereof, and the custodian shall thereupon release the articles seized.

SEC. 9. (a) The Secretary of Agriculture and the Secretary of Commerce are authorized to make such expenditures for construction, equipment, maintenance, repairs, and improvements, including expenditures for personal services at the seat of government and elsewhere, as may be necessary to execute the functions imposed upon them by this Act and as may be provided for by Congress from time to time.

(b) For such expenditures there is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, the sum of \$50,000, to be available until expended, \$25,000 of such sum to be available for expenditure by the Secretary of Agriculture and \$25,000 by the Secretary of Commerce.

SEC. 10. There is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, and to be available until expended, the sum of \$1,500,000, or so much thereof as may be necessary for the acquisition of any areas authorized by this Act to be acquired for such refuge and for all necessary expense incident to the acquisition of such areas; but no money shall be available for the acquisition of any area until the Secretary of Agriculture has ascertained that all of the areas to be acquired under this Act will be acquired within the amounts appropriated or authorized to be appropriated therefor and at an average price not in excess of \$5 per acre, and not in excess of the average selling price, during

the years 1921, 1922, and 1923, of comparable lands within the vicinity of such areas.²⁹

SEC. 11. Any person who shall violate or fail to comply with any provision of or any regulation made pursuant to this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not more than \$500 or be imprisoned not more than six months, or both.

SEC. 12. As used in this Act the term "person" includes an individual, partnership, association, or corporation.

SEC. 13. Nothing in this Act shall be construed as exempting any portion of the Mississippi River from the provisions of Federal laws for the improvement, preservation, and protection of navigable waters, nor as authorizing any interference with the operations of the War Department in carrying out any project now or hereafter adopted for the improvement of said river.

1924—Joint Resolution No. 34 (43 Stat. L., 668)—Joint Resolution To provide that the powers and duties conferred upon the Governor of Alaska under existing law for the protection of wild game animals and wild birds in Alaska be transferred to and be exercised by the Secretary of Agriculture.

That, on and after July 1, 1924, the powers and duties heretofore conferred upon the Governor of Alaska by existing law for the protection of wild game animals and wild birds in Alaska are hereby conferred upon and shall be exercised by the Secretary of Agriculture; and all money available or appropriated in any Act for the fiscal year ending June 30, 1925, for carrying into effect the Act approved May 11, 1908, entitled "An Act for the protection of game in Alaska and for other purposes" (35 Stat. L., 102), including salaries, traveling expenses of game wardens and all other necessary expenses, is hereby transferred to the credit of the Department of Agriculture to be expended by the Secretary of Agriculture for such purposes.

1925—Act of January 13, 1925 (43 Stat. L., 739). An Act To establish an Alaska Game Commission to protect game animals, land fur-bearing animals, and birds, in Alaska, and for other purposes.

[SECTION 1]. That this Act shall be known by the short title of the "Alaska Game Law."

SEC. 2. Definitions. That for the purposes of this Act the following shall be construed, respectively, to mean:

Commission: The Alaska Game Commission:

Territory: Territory of Alaska.

Person: The plural or the singular, as the case demands, including individuals, associations, partnerships, and corporations, unless the context otherwise requires.

²⁹ Amended by Joint Resolutions of March 4, 1925 (43 Stat. L., 1354) and May 12, 1928 (45 Stat. L., 420).

Take: Taking, pursuing, disturbing, hunting, capturing, trapping, or killing game animals, land fur-bearing animals, game or nongame birds, attempting to take, pursue, disturb, hunt, capture, trap, or kill such animals or birds, or setting or using a net, trap, or other device for taking them, or collecting the nests or eggs of such birds, unless the context otherwise requires. Whenever the taking of animals, birds or nests or eggs of birds is permitted, reference is had to taking by lawful means and in lawful manner.

Open season: The time during which birds or animals may lawfully be taken. Each period of time prescribed as an open season shall be construed to include the first and last days thereof.

Close season: The time during which birds and animals may not be taken.

Transport: Shipping, transporting, carrying, importing, exporting, or receiving or delivering for shipment, transportation, carriage, or export, unless the context otherwise requires.

Game animals: Deer, moose, caribou, elk, mountain sheep, mountain goat, and the large brown and grizzly bears, which shall be known as big game.

Land fur-bearing animals: Beaver, muskrat, marmot, ground squirrel (spermophiles), fisher, fox, lynx, marten or sable, mink, weasel or ermine, land otter, wolverine, polar bear, and black bear, including its brown and blue (or glacier bear) color variations.

Game birds: Migratory waterfowl, commonly known as ducks, geese, brant, and swans; shore birds, commonly known as plover, sandpipers, snipe, little brown cranes, and curlew, and the several species of grouse and ptarmigan, which shall be known as small game.

Nongame birds: All wild birds except game birds.

SEC. 3. Application and Construction. That for the purposes of this Act a citizen of the United States who has been domiciled in the Territory not less than one year, for the purpose of making his permanent home therein, or a foreign-born person not a citizen of the United States who has declared his intention to become a citizen of the United States, and has been domiciled in the Territory for a like period and purpose, shall be considered a resident; but if such a foreign-born person shall not have been admitted to citizenship within seven years from the date he declared his first intention to become a citizen, he shall thereafter be deemed to be an alien until admitted to citizenship. A foreign-born person not a citizen of the United States who has not declared his intention to become a citizen of the United States, or who has not resided in the Territory for at least one year after having declared such intention, shall be considered an alien.

That if any clause, sentence, paragraph, or part of this Act shall for any reason be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect, impair, or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, or parts thereof directly involved in the controversy in which such judgment shall have been rendered.

SEC. 4. Alaska Game Commission created. That a commission to be known as the "Alaska Game Commission" is hereby created. The commission shall consist of five members, four of whom shall be appointed by the Secretary of Agriculture within sixty days after the passage of this Act, one member from each of the four judicial divisions of the Territory, each of whom shall be a resident citizen of the district from which he is

appointed, and shall before his appointment have been for five years a resident of Alaska and shall not be a Federal employee, and all of whom shall serve until June 30 next following and thereafter one to serve one year, one to serve two years, one to serve three years, and one to serve four years, as the members of the commission may determine by lot, and thereafter their successors to be appointed in like manner to serve for four years unless sooner removed. The fifth member shall be the chief representative of the Bureau of Biological Survey resident of Alaska, who shall be the executive officer and fiscal agent of the commission and under the direction of the commission shall direct the administration of the provisions of this Act and disburse such sums as may be allotted therefor. The Secretary of Agriculture may remove a commissioner for inefficiency, neglect of duty, or misconduct in office, giving him a copy of the charges against him and opportunity to be publicly heard in person or by counsel in his own defense; pending the investigation of the charges the Secretary may suspend such commissioner. The Secretary of Agriculture shall fill vacancies on the commission by appointment for the unexpired term, and a vacancy shall be filled by appointment from the same judicial division in which it occurs. The office of any commissioner shall be vacant upon his removing his residence from the judicial division from which he was appointed.

That the members of the commission, other than the executive officer, shall receive no compensation for their services as members thereof, except a per diem of \$10 for each member for each day going to and from and in actual attendance at meetings of the commission, but the total salary or per diem compensation of the member from the second judicial division shall not exceed the sum of \$1,500, and that of any of the other members, except the executive officer, the sum of \$900 in any one fiscal year, and each such member in addition shall have reimbursed to him in any one fiscal year for actual and necessary traveling and subsistence expenses incurred or made in the discharge of his official duties a sum not to exceed the maximum amount allowed him for salary, which shall be paid on proper vouchers from the appropriation for the enforcement of the Alaska game law. The executive officer shall be paid his salary and shall have reimbursed to him all actual and necessary traveling and other expenses and disbursements in accordance with the fiscal regulations of the Department of Agriculture, payable from the appropriation for the enforcement of the Alaska game law and from such other appropriations for the work of the Bureau of Biological Survey in the Territory as the Secretary of Agriculture may designate.

That the commission shall maintain and have its principal office in the capital of the Territory. The members of the commission shall meet at such principal office immediately following their appointment at a time designated by the Secretary of Agriculture, and shall organize by electing one member chairman and one member secretary, and shall determine by lot the terms of the members, other than the term of the executive officer.

That a majority of the members shall constitute a quorum for the transaction of business. All investigations, inquiries, hearings, and decisions of a commissioner shall be deemed to be the investigations, inquiries, hearings, and decisions of the commission, when approved by it and entered by it in its minutes, and every order made by a commissioner, when approved and confirmed by the commission and ordered filed in its office, shall be and be deemed to be the order of the commission. The commission shall have an official seal.

SEC. 5. Duties and Powers of the Commission, Wardens, and Officers. That the commission shall have authority to employ and remove game wardens, deputies, clerks, and such other assistants as may be necessary, to fix their periods of service and compensation, to rent quarters, and to incur other expenses, including printing, necessary for the enforcement of this Act and for which appropriation has been made; but, subject to review by the commission, the executive officer may suspend or remove any game warden or other employee for cause, including insubordination.

That each member of the commission, any warden, any person appointed by the Secretary of Agriculture or by the commission to enforce this Act, any Forest Service employee, marshal, deputy marshal, collector or deputy collector of customs, officer of a Coast Guard vessel, special officer of the Department of Justice, or licensed guide shall have power, in or out of the Territory, and it shall be his duty, to arrest without warrant any person committing a violation of this Act in his presence or view, and to take such person immediately for examination or trial before an officer or court of competent jurisdiction; he shall have power to execute any warrant or other process issued by an officer or court of competent jurisdiction for the enforcement of the provisions of this Act; and he shall have authority, with a search warrant, to search any place at any time. Any officer or employee empowered to enforce this Act shall have with respect to camps and vessels of the United States like authority and powers of search as are conferred with respect to such vessels upon wardens appointed by the Secretary of Agriculture for the protection of land fur-bearing animals in Alaska, by the Act of June 30, 1921³⁰ (Forty-first Statutes at Large, page 694, at page 716). The several judges of the courts established under the laws of the United States and United States commissioners may, within their respective jurisdictions, upon proper oath or affirmation showing probable cause, issue warrants in all such cases. All guns, traps, nets, boats, dogs, sleds, and other paraphernalia used in or in aid of a violation of this Act may be seized, and all animals, birds, or parts thereof, or nests or eggs of birds taken, transported or possessed contrary to the provisions of this Act shall be seized within or outside the Territory by any officer or person authorized to enforce this Act, and upon conviction of the offender or upon judgment of a court of the United States that the same were being used or were taken, transported, or possessed in violation of this Act, shall be forfeited to the United States and disposed of as directed by the court having jurisdiction, and if sold the proceeds of sale shall be transmitted by the clerk of the court to the executive officer to be disposed of as are other receipts of the commission. Any property, animals, birds, or parts thereof, or nests or eggs of birds seized by a licensed guide shall be safely held and promptly delivered by him to the commission, a game warden, or to a marshal or a deputy marshal. It shall be the duty of the Secretary of the Treasury and the Postmaster General, upon request of the Secretary of Agriculture, to aid in carrying out the provisions of this Act.

³⁰ An error. Though so printed in the Statutes the act of May 31, 1920 [41 Stat. L., 694, 716], is meant. The date given, June 30, 1921, is the end of the fiscal year for which the act of May 31, 1920, makes appropriations.

SEC. 6. Bond of Commissioners. That before entering upon the duties of his office, each member of the commission, other than the executive officer, shall execute and file with the Secretary of Agriculture a bond to the people of the United States in the sum of \$1,000, with sufficient sureties, and the executive officer shall so file such a bond in the sum of \$20,000, and each game warden or other person authorized by the commission to sell licenses shall so file such a bond in the sum of \$500, conditioned for the faithful performance of their respective duties, and for the proper accounting and paying over, pursuant to law, of all moneys or property received by them, respectively. Each member of the commission and each of such game wardens or other persons shall have reimbursed to him on proper voucher the premium paid by him on his bond.

SEC. 7. Estimates and Reports. That the commission, on or before the 15th day of July of each year, shall file with the Secretary of Agriculture a detailed estimate of the appropriation necessary for the service during the following fiscal year, and on or before the 1st day of October of each year shall submit a detailed report to him covering the administration of the law, including all expenditures and other operations for the preceding fiscal year, and such estimates shall be subject to revision by him.

SEC. 8. Taking of Animals and Birds Restricted. That, unless and except as permitted by this Act or by regulations made pursuant to this Act, it shall be unlawful for any person to take, possess, transport, sell, offer to sell, purchase, or offer to purchase any game animal, land fur-bearing animal, wild bird, or any parts thereof, or any nest or egg of any such bird, or, except under regulations of the Secretary of Agriculture, to molest, damage, or destroy beaver or muskrat houses: *Provided*, That nothing in this Act shall be construed to prevent the collection or exportation of animals, birds, parts thereof, or nests or eggs of birds for scientific purposes, or of live animals, birds, or eggs of birds, for propagation or exhibition purposes, under a permit issued by the Secretary of Agriculture and under such regulations as he may prescribe. Land fur-bearing or game animals which escape from captivity, unless recaptured by their owners, and all fur and game animals hereafter introduced into Alaska are declared to be wild fur-bearing or game animals and shall be subject to the provisions of this Act.

SEC. 9. Poison, Use Prohibited. That no person shall at any time use any poison to kill any animal or bird protected by this Act or put out poison or a poisoned bait where any such animal or bird may come in contact with it; but a game warden or predatory animal hunter employed by or under the direction of the commission may use poison to kill wolves, coyotes, or wolverines, under such regulations as the commission may adopt; and no person shall sell or give any strychnine or other poison designated by the commission to any hunter or trapper, including native Indians or Eskimos who hunt or trap. No hunter or trapper, including native Indians or Eskimos who hunt and trap, shall have any strychnine or other poison designated by the commission in his possession, and any such poison found in the possession of any such person shall be seized and disposed of in such manner as the commission may determine. Any person selling or otherwise disposing of any strychnine or any other poison designated by the commission shall keep a record in a special book showing the name and address of each person purchasing or otherwise procuring it and the kind and amount

thereof, which record shall at all times be open to inspection by any game warden or other officer authorized to enforce this Act, and he shall transmit such information monthly to the commission.

SEC. 10. Regulations. That the Secretary of Agriculture, upon consultation with or recommendation from the commission, is hereby authorized and directed from time to time to determine when, to what extent, if at all, and by what means game animals, land fur-bearing animals, game birds, non-game birds, and nests or eggs of birds may be taken, possessed, transported, bought, or sold, and to adopt suitable regulations permitting and governing the same in accordance with such determinations, which regulations shall become effective ninety days after the date of publication thereof by the Secretary of Agriculture; but no such regulation shall permit any person to take any female yearling or calf moose, any doe yearling or fawn deer, or any female or lamb mountain sheep except under permit for scientific, propagation, or educational purposes; or to use any dog in taking game animals; or to sell the heads, hides, or horns of any game animals, except the hides of moose, caribou, deer, and mountain goat which the regulations may permit to be sold under such restrictions as the Secretary may deem to be appropriate; or to use any shotgun larger than a number 10 gauge; or to use any airplane, steam or power launch, or any boat other than one propelled by paddle, oars, or pole in taking game animals or game birds; or to sell any game animals, game birds, or parts thereof, to the owner, master, or employee of any coastal or river steamer or commercial power or sail boat, or to procure for serving or to serve any such game animals, game birds, or parts thereof, in any cannery or other commercial mess house, or to the employees on any such steamer or boat; nor, except as herein provided, shall prohibit any Indian or Eskimo, prospector, or traveler to take animals or birds during the close season when he is in absolute need of food and other food is not available, but the shipment or sale of any animals or birds or parts thereof so taken shall not be permitted, except that the hides of animals so taken may be sold within the Territory, but the Secretary by regulation may prohibit such native Indians or Eskimos, prospectors, or travelers from taking any species of animals or birds for food during the close season in any section of the Territory within which he shall determine that the supply of such species of animals or birds is in danger of extermination; nor shall any such regulation contravene any of the provisions of the migratory bird treaty Act and regulations.

SEC. 11. Licenses: Subdivision A. Nonresident Hunting License. That, except as otherwise permitted by this Act, or by regulation made pursuant thereto, no nonresident shall take or possess any of the animals or birds protected by this Act without first having procured a nonresident hunting and trapping license as herein provided.

Subdivision B. Resident Shipping License. That no resident of the Territory shall export any game animal or part thereof, except that he may export for mounting and return to the Territory in any one year but not for sale, not to exceed two heads or trophies of each species of game animal legally killed by him, upon first procuring a resident shipping license as herein provided, but the Secretary may, by regulation, permit a citizen of the United States, who has been a resident of the Territory for at least two years and who is removing his residence from the Territory, to export trophies of game animals legally acquired by him, upon first procuring a resident shipping license as herein provided.

Subdivision C. Resident Hunting and Trapping Licenses. That the commission whenever it shall deem expedient, may by regulation require residents of the Territory to procure resident hunting and trapping licenses authorizing them to take animals and birds protected by this Act, and when such licenses shall have been required of residents the fee therefor shall be as follows: For each hunting license the sum of \$2 and for each trapping license the sum of \$2, but no such license shall be required of native-born Indians, Eskimos, or half-breeds who have not severed their tribal relations by adopting a civilized mode of living or by exercising the right of franchise. After the expiration of sixty days from the adoption of such regulation no resident shall take any animal or bird protected by this Act without having first procured resident hunting and trapping licenses as herein provided.

Subdivision D. Registered Guide License. That only a resident citizen or a resident native Indian or Eskimo of the Territory may act as guide for a nonresident in any section of the Territory where the commission by regulation requires nonresidents to employ guides, and he shall first register with the commission in a book which it shall keep for this purpose and procure a registered guide license as herein provided, and the commission shall determine by regulation the qualifications required of such guides. No person other than a registered guide shall act as guide for a nonresident in any section of the Territory where guides are required by regulation of the commission to be registered.

Subdivision E. Alien Special License. That no alien shall take any of the animals or birds protected by this Act, or own or be possessed of a shotgun, rifle, or other firearm, except under an alien special license issued as herein provided.

Subdivision F. Reports. Each person to whom a license to take birds or animals, or to deal in furs, is issued, shall, on or before thirty days after the expiration of his license, make a written report to the commission on a form prepared and furnished by it, stating the kind and number of each species of bird or animal taken, purchased, or otherwise procured under such license. A licensee who willfully fails or neglects to make such report shall not be entitled to, nor shall he be granted, a license to take birds or animals or deal in furs for one year from the date such report is due, but no other punishment shall be imposed.

Subsection G. Fur-Farm License. That no person shall engage in the business of farming land fur-bearing animals or possess them for purposes of propagation without first having procured a fur-farm license as herein provided.

Subdivision H. Fur Dealers, Licenses, Fees. No person shall buy or sell the skins of fur-bearing animals, or engage in, carry on, or be concerned in the business of buying, selling, or trading in the skins of fur-bearing animals protected by this Act without first having procured a license as herein provided, but no license shall be required of a native-born resident Indian, Eskimo, or half-breed who has not severed his tribal relations by adopting a civilized mode of living or by exercising the right of franchise, or of a hunter or trapper selling the skins of such animals which he has lawfully taken, or of a person not engaged or employed in the business of trading in such skins to purchase them for his own use but not for sale.

The applicant for such a license shall accompany his application by the required fee, as follows:

(a) If the applicant is a resident of the Territory, the sum of \$10.

(b) If the applicant is a nonresident of the Territory, who is a citizen of the United States, or is a corporation, association, or copartnership organized under the laws of the Territory or of a State of the United States, the sum of \$250.

(c) If the applicant is an alien, or is a corporation, association, or copartnership not organized under the laws of the Territory or of a State of the United States, the sum of \$500.

If a resident agent for a fur dealer within the meaning of clause (c) of this section, the sum of \$10.

If a nonresident, who is a citizen of the United States and an agent for a dealer within the meaning of said clause (c), the sum of \$250.

Subdivision I. Fees and Applications for, and Issuance of Licenses. Licenses, with the exception of alien special licenses and resident shipping licenses, shall be issued by the commission through its members, game wardens, and other persons authorized by it in writing to sell licenses. Alien special licenses shall be issued only by the members of the commission, and resident shipping licenses shall be issued by members of the commission and by the collector of customs at the port of shipment. Application blanks for licenses shall be furnished by the commission and shall be in such form as the commission may by regulation determine; and each application shall be subscribed and sworn to by the applicant before an officer authorized to administer oaths in the Territory; and the members of the commission, and its game wardens and other persons authorized in writing by it to issue licenses are hereby authorized to administer oaths to applicants for such licenses. The applicant for a license shall accompany his application with a license fee as follows:

Nonresident big game, small game, and fur-bearing animal hunting and trapping license, \$50.

Nonresident small game hunting license, \$10.

Resident shipping and return license, \$1 for each trophy.

Resident removing from Territory, \$5 for each trophy of big game.

Registered guide license, \$10.

Alien special license, \$100.

Fur farm license, \$2.

Subdivision J. False Statement in Application for and Alteration and Expiration of Licenses. That any false statement in an application for license as to citizenship, place of residence or other material facts shall render null and void the license issued upon it. Any person who shall make any false statement in an application for a license shall be deemed guilty of perjury, and upon conviction thereof shall be subject to the penalties provided for the commission of perjury. No person shall alter, change, loan, or transfer to another any license issued to him in pursuance of this Act, nor shall any person other than the one to whom it is issued use such license; and each of such licenses shall expire the 30th day of June next succeeding its issuance.

Subdivision K. Proceeds of Licenses, Disposition of. That each officer or person selling licenses shall, as soon as practicable after the first day of each month, transmit the proceeds thereof with a report of such sales to the executive officer, who shall keep accurate records thereof and of receipts from all other sources and promptly transmit 50 per centum thereof

to the Secretary of Agriculture, to be covered into the Treasury of the United States as miscellaneous receipts, and 50 per centum thereof to the treasurer of the Territory to be covered into the territorial school fund.

SEC. 12. Collectors of Customs, Duties Of. That it shall be the duty of collectors of customs at ports of entry in the United States to keep accurate accounts of all consignments of game birds, game animals, skins of land fur-bearing animals, and parts thereof received from or returned to the Territory, except birds, nests, and eggs shipped under a scientific permit issued by the Secretary of Agriculture; and it shall be the duty of all collectors of customs to enforce the provisions of regulations adopted pursuant to this Act with respect to shipments of animals or birds or nests or eggs of birds.

SEC. 13. United States Attorneys, Duties Of. That it shall be the duty of the United States attorney for the division in which any wild animal or wild bird, or part thereof, or nest or egg of such bird, or any gun, trap, net, boat, dog, sled, or other paraphernalia has been seized, or has been used, taken, transported, bought, sold, or possessed contrary to the provisions of this Act, to institute an action *in rem* against it for the forfeiture thereof to the United States in any case in which the disposition of such article is not involved in a criminal prosecution; the possession of any wild animal, bird, or part thereof, or nest or egg of such bird, during the time when the taking of it is prohibited, shall, in any such action, constitute *prima facie* evidence that it was taken, possessed, bought, sold, or transported in violation of the provisions of this Act, and the burden of proof shall be upon the possessor or claimant of it to overcome the presumption of illegal possession and to establish the fact that it was obtained and is possessed lawfully; and in case of judgment being rendered in favor of the United States, it shall be disposed of as directed by the court having jurisdiction, and if sold, the proceeds of sale shall be transmitted by the clerk of the court to the executive officer to be disposed of as are other receipts of the commission.

SEC. 14. Transfer of Funds. That the unexpended balances of any sums appropriated by the Agricultural Appropriation Act for the fiscal years ending June 30, 1924 and 1925, for enforcing the provisions of section 1956 of the Revised Statutes, as amended, so far as it relates to the protection of land fur-bearing animals in the Territory, or by the Sundry Civil Act for the fiscal years ending June 30, 1924 and 1925, for the protection of game in the Territory, are hereby made available until expended for the expenses of carrying into effect the provisions of this Act and regulations made pursuant thereto.

SEC. 15. Penalties. That unless a different or other penalty or punishment is herein specifically prescribed, a person who violates any provision of this Act, or who fails to perform any duty imposed by this Act or any order or regulation adopted pursuant to this Act, is guilty of misdemeanor and upon conviction thereof shall be fined not less than \$25 nor more than \$500 or be imprisoned not more than six months, or both; and, in addition thereto, the conviction of any licensed hunter for a violation of any of the provisions of this Act shall cause a forfeiture of his license and he shall surrender it upon demand to any person authorized by the commission to receive it; that all moneys from fines shall be transmitted by the clerk of the court to the executive officer to be disposed of as are other receipts of the commission.

That any licensed guide who shall fail or refuse to report promptly to the commission any violation of this Act of which he may have knowledge, shall be guilty of a violation of this Act, and, in addition thereto, shall have his license revoked and shall be ineligible to act as a licensed guide for a period of five years from the time of his conviction therefor, or, of the establishment to the satisfaction of the commission of definite proof of such offense.

SEC. 16. Existing Legislation Continued In Force Temporarily. That the provisions of existing laws relating to the protection of game and fur-bearing animals, birds, and nests and eggs of birds in the Territory shall remain in full force and effect until the expiration of ninety days from the date of the publication of regulations of the Secretary of Agriculture adopted pursuant to the provisions of this Act.

SEC. 17. That nothing in this Act contained shall be construed as repealing or modifying in any manner section 6 of the Act of Congress approved February 26, 1917 (Thirty-ninth Statutes at Large, page 938), entitled "An Act to establish the Mount McKinley National Park in the Territory of Alaska."

SEC. 18. Date Effective. That the provisions of this Act relating to the creation and organization of the commission and with respect to making or adopting regulations shall take effect on its passage and approval; all other provisions of this Act shall take effect ninety days from the date of the publication of regulations of the Secretary of Agriculture.

1925—Act of February 10, 1925 (43 Stat. L., 822, 840, 841, 842)—
An Act Making appropriations for the Department of
Agriculture for the fiscal year ending June 30, 1926, and
for other purposes.

* * * *

BUREAU OF BIOLOGICAL SURVEY

* * * *

. . . *Provided further*, That \$12,000 may be used for the construction of a highway through Sullys Hill National Park and in the construction thereof the chief of the Bureau of Biological Survey may cooperate with the Bureau of Public Roads; . . .

* * * *

. . . and for carrying into effect the Act entitled "An Act for the protection of game in Alaska, and for other purposes," approved May 11, 1908, as amended by the Act approved June 7, 1924 (Public Resolution 34, Sixty-eighth Congress) [43 Stat. L., 650], §85,095;²¹

UPPER MISSISSIPPI RIVER REFUGE

For the acquisition of areas of land or land and water pursuant to the Act entitled, "An Act to establish the Upper Mississippi River Wild Life and Fish Refuge," approved June 7, 1924, and for all necessary expenses

²¹ In all subsequent appropriation acts clauses relating to protection of wild life in Alaska changed to conform to situation created by enactment of Alaska game law of January 13, 1925.

incident thereto, including the employment of persons and means in the city of Washington and elsewhere, \$375,000 (of which \$75,000 shall be immediately available), being part of the sum of \$1,500,000 authorized to be appropriated for such purpose by section 10 of said Act; and for all necessary expenses of the Secretary of Agriculture authorized to be appropriated for by section 9 of said Act, \$25,000, to be immediately available; in all, \$400,000, which shall be available until expended: *Provided*, That the Secretary of Agriculture may incur obligations and enter into contracts for the acquisition of additional areas to an amount which, inclusive of the \$375,000 hereby appropriated, shall not exceed a total of \$1,500,000, and such contracts shall be deemed a contractual obligation of the Federal Government.³²

Total, Bureau of Biological Survey, \$1,372,768, of which amount not to exceed \$213,463 may be expended for personal services in the District of Columbia.

1925—Act of March 4, 1925 (43 Stat. L., 1313, 1326)—An Act Making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1925, and prior fiscal years, to provide supplemental appropriations for the fiscal years ending June 30, 1925, and June 30, 1926, and for other purposes.

* * * *

BUREAU OF BIOLOGICAL SURVEY

The amount, \$85,095, included in the Agricultural Appropriation Act for the fiscal year 1926, for investigations, experiments, and demonstrations for the welfare, improvement, and increase of the reindeer industry in Alaska, and for the enforcement of section 1956 of the Revised Statutes, as amended, so far as it relates to the protection of land fur-bearing animals in Alaska, is hereby made available to the Secretary of Agriculture during the fiscal year 1926 to carry out the provisions of the Alaska game law, approved January 13, 1925.³³

1925—Joint Resolution of March 4, 1925 (43 Stat. L., 1354)—Joint Resolution To amend Section 10 of the Act entitled "An Act to establish the upper Mississippi River wild life and fish refuge."

That section 10 of the Act entitled "An Act to establish the upper Mississippi River wild life and fish refuge," approved June 7, 1924 (Forty-third Statutes at Large, page 650), be, and the same hereby is, amended by striking out that part of said section which reads: "but no money shall

³² In the Bureau of Fisheries appropriation for 1926 in the act of February 27, 1925 (43 Stat. L., 1014, 1047) there is an item of \$25,000 for the construction of buildings, fish ponds, etc.; and for maintenance, operation, and other expenses at the Refuge.

³³ See Joint Res. of June 7, 1924 (43 Stat. L., 668); act of February 10, 1925 (43 Stat. L., 822); and Section 14 of act of January 13, 1925 (43 Stat. L., 739).

be available for the acquisition of any area until the Secretary of Agriculture has ascertained that all of the areas to be acquired under this Act will be acquired within the amounts appropriated or authorized to be appropriated therefor and at an average price not in excess of \$5 per acre, and not in excess of the average selling price, during the years 1921, 1922, and 1923, of comparable lands within the vicinity of such areas," and by substituting in lieu thereof the following: "*Provided*, That the Secretary of Agriculture shall not pay for any land or land and water a price which when added to the price of land or land and water theretofore purchased, shall exceed an average cost of \$5 per acre."

1926—Act of July 3, 1926 (44 Stat. L., 821)—An Act To provide for the leasing of public lands in Alaska for fur farming, and for other purposes.

[SECTION 1]. That the Secretary of the Interior, in order to encourage and promote development of production of furs in the Territory of Alaska, is hereby authorized to lease to corporations organized under the laws of the United States, or of any State or Territory thereof, citizens of the United States, or associations of such citizens, public lands of the United States in the Territory of Alaska suitable for fur farming, in areas not exceeding six hundred and forty acres, and for periods not exceeding ten years, upon such terms and conditions as he may by general regulations prescribe: *Provided*, That where leases are given hereunder for islands or lands within the same lease may, in the discretion of the Secretary of the Interior, be for an area not to exceed thirty square miles: *Provided further*, That nothing herein contained shall prevent the prospecting, locating, development, entering, leasing, or patenting of the mineral resources of any lands so leased under laws applicable thereto: *And provided further*, That this Act shall not be held nor construed to apply to the Pribilof Islands, declared a special reservation by the Act of Congress approved April 21, 1910 [36 Stat. L., 326]: *And provided further*, That any permit or lease issued under this Act shall reserve to the Secretary of the Interior the right to permit the use and occupation of parts of said leased areas for the taking, preparing, manufacturing, or storing of fish or fish products, or the utilization of the lands for purposes of trade or business, to the extent and in the manner provided by existing laws or laws which may be hereafter enacted.

SEC. 2. That the Secretary of the Interior is hereby authorized to perform any and all acts, and to make such rules and regulations as may be necessary and proper, for the purpose of carrying the provisions of this Act into effect including provisions for the forfeiture of any lease for failure to stock the same with fur-bearing animals within a period of one year from the date of the lease, or in the event of the devotion of the lease area primarily to any purpose other than the rearing of such fur-bearing animals.

1927—Act of February 10, 1927 (44 Stat. L., 1068)—An Act Authorizing the designation of an *ex-officio* Commission for Alaska for each of the executive departments of the United States, and for other purposes.

[SECTION 1]. That the Secretaries of the Departments of the Interior, Agriculture, and Commerce be, and they are hereby, authorized and em-

powered, each for his own department, to designate an employee thereof, employed in and residing in Alaska, who shall be styled *ex officio* Commissioner for Alaska for the department from which he is selected and who from the date of his designation, shall reside and maintain an office in the capital of Alaska.

SEC. 2. That each of said Secretaries shall delegate and assign to the commissioner representing his department general charge of any or all matters in Alaska under the jurisdiction of such department, or of any bureau or agency thereof, to the extent, in the manner, and subject to such supervision and control as the Secretary may deem proper and expedient.

SEC. 3. That, to the extent the respective Secretaries may determine, employees of the departments affected by this Act who are stationed in Alaska shall be placed under the direct supervision and control of the *ex officio* commissioner for his department, herein provided for, together with any additional force which may be detailed by the Secretary of the Interior, Agriculture, or Commerce, from the personnel of his department, should necessity therefor arise; but nothing herein contained shall be construed to authorize the employment of any additional personnel or to warrant the transfer of any clerk or other employee from one department to another, except in the manner provided by law.

SEC. 4. That the Secretaries named in section 1 hereof may transfer to the officer designated hereunder as his representative the records or transcripts of records, property (including office and field equipment), and unexpended balances of appropriations which they may deem necessary or proper to transfer to Alaska in order to carry into effect the provisions of this Act.

SEC. 5. That the President of the United States may, by order in writing, should he deem it conducive to economical and effective administration, and with the concurrence of all the Secretaries of the respective departments involved, place under the supervision and direction of one of the three *ex officio* commissioners provided for in section 1 hereof, and subject to the provisions of section 2 of this Act, any governmental activity relating to Alaska provided for by law now under the direction of the Secretaries named in section 1 hereof, and to transfer to the officer so selected, the necessary personnel, records, or transcripts of records, property (including office and field equipment), and unexpended balances of appropriations: *Provided*, That the charge and control of all matters relating to the construction and maintenance of roads in Alaska which may now be under the jurisdiction of any other department, bureau, or agency of the Government, together with the records or transcripts thereof, the property including field and office equipment and the unexpended balances of appropriations pertaining thereto, may, with the concurrence of the Secretaries of the respective departments involved, be assigned and transferred to the Board of Road Commissioners for Alaska, created by and in pursuance of the provisions of section 2 of the Act of Congress entitled "An Act to provide for the construction and maintenance of roads, the establishment and maintenance of schools, and the care and support of insane persons in the District of Alaska, and for other purposes," approved January 27, 1905, as amended by the Act approved May 14, 1906.

SEC. 6. That the Secretary of the Interior be, and he is hereby, directed to make an examination as to the feasibility and propriety of consolidating into a single force the police and law enforcement agencies of the Federal Government in Alaska, and to report to the next session of the Congress his conclusions with reference thereto and the facts upon which they are based, together with a statement of the cost of such consolidation as compared with present expenditures for law enforcement in that Territory.

1927—Joint Resolution of February 25, 1927 (44 Stat. L., 1246)—

Joint Resolution Authorizing the acceptance of title to certain lands in Teton County, Wyoming, adjacent to the winter elk refuge in said State established in accordance with the Act of Congress of August 10, 1912 (Thirty-seventh Statutes at Large, page 293).

[SECTION 1]. That the Secretary of Agriculture be, and he is hereby, authorized to accept, on behalf of and without expense to the United States, from the Izaak Walton League of America, or its authorized trustees, a gift of certain lands in Teton County, Wyoming, described as the south half of section 4; the east half of the southeast quarter of section 5; the southwest quarter of the southeast quarter of section 5; the south half of the southwest quarter of section 5; the southeast quarter of the northeast quarter of section 7; the east half of the southeast quarter of section 7; the southwest quarter of the southeast quarter of section 7, and lot 4 of section 7; all of section 8; the north half of the northeast quarter of section 9; the north half of the northwest quarter of section 9; and the southwest quarter of the northwest quarter of section 9; the north half of the northeast quarter of section 17; lot 1 of section 18; and the east half of the northwest quarter of section 18; all in township 41 north, range 115 west, of the sixth principal meridian, including all the buildings and improvements thereon, and all rights, easements, and appurtenances thereunto appertaining, subject to the conditions that they be used and administered by the United States, under the supervision and control of the Secretary of Agriculture, for the grazing of, and as a refuge for, American elk and other big game animals, and that they be known as the Izaak Walton League addition to the winter elk refuge: *Provided*, That upon the conveyance of said lands to the United States, as herein provided, they shall become a part of the winter elk refuge established pursuant to the authority contained in the Act of August 10, 1912 (Thirty-seventh Statutes at Large, page 293), and shall be subject to any laws governing the administration and protection of said refuge.

1927—Act of March 4, 1927 (44 Stat. L., 1452)—An Act To provide for the protection, development, and utilization of the public lands in Alaska by establishing an adequate system for grazing livestock thereon.

DECLARATION OF POLICY

SECTION 1. It is hereby declared to be the policy of Congress in promoting the conservation of the natural resources of Alaska to provide for the

protection and development of forage plants and for the beneficial utilization thereof for grazing by livestock under such regulations as may be considered necessary and consistent with the purposes and provisions of this Act. In effectuating this policy the use of these lands for grazing shall be subordinated (a) to the development of their mineral resources, (b) to the protection, development, and utilization of their forests, (c) to the protection, development, and utilization of their water resources, (d) to their use for agriculture, and (e) to the protection, development, and utilization of such other resources as may be of greater benefit to the public.

* * * *

SEC. 2. As used in this Act—

* * * *

(3) The term "Secretary" means the Secretary of the Interior.

* * * *

SEC. 15. (a) The Secretary shall promulgate all rules and regulations necessary to the administration of this title, shall execute its provisions, . . .

(b) The Secretary of Agriculture is authorized to continue investigations, experiments, and demonstrations for the welfare, improvement, and increase of the reindeer industry in Alaska, and upon the request of the Secretary of the Interior to coöperate in matters pertaining to the care of plant and animal life, including reindeer.

1928—Joint Resolution of April 10, 1928 (45 Stat. L., 420)—

Joint Resolution To authorize the Secretary of Agriculture to accept a gift of certain lands in Clayton County, Iowa, for the purposes of the Upper Mississippi River Wild Life and Fish Refuge Act.

That the Secretary of Agriculture be, and hereby is, authorized to accept on behalf of the United States from James B. Munn, of New York City, New York, a gift of certain lands in Clayton County, Iowa, described as Government lot 1, section 23, township 94 north, range 3 west, fifth principal meridian, fifty-eight and fifty one-hundredths acres; north half Government lot 2, section 23, township 94 north, range 3 west, fifth principal meridian, twenty-four and thirty one-hundredths acres; part of Government lot 1, section 11, township 94 north, range 3 west, fifth principal meridian, eleven acres; Government lot 4, section, 11, township 94 north, range 3 west, fifth principal meridian, forty-five and forty-five one-hundredths acres; Government lot 3, section 35, township 95 north, range 3 west, fifth principal meridian, sixty-eight and forty one-hundredths acres; Government lot 4 section 35, township 95 north, range 3 west, fifth principal meridian, thirty-five acres; south part Government lot 2, section 35, township 95 north, range 3 west, fifth principal meridian, twenty-eight acres; part of north half, section 27, township 95 north, range 3 west, fifth principal meridian, one hundred and thirty-six and seventy-six one-hundredths acres; part of south-west quarter, section 22, township 95 north, range 3 west, fifth principal meridian, forty-nine acres; part of east half, section 22, township 95 north, range 3 west, fifth principal meridian, thirty-one and fifty-nine one-hundredths acres. Total area, four hundred and eighty-eight acres, including all the buildings and improvements thereon and all rights, easements, and appurte-

nances thereunto appertaining; and upon acceptance of said lands by the Secretary of Agriculture they shall become a part of the upper Mississippi River wild life and fish refuge established pursuant to the authority contained in the Upper Mississippi River Wild Life and Fish Refuge Act approved June 7, 1924 [4 Stat. L., 650].

1928—Act of April 23, 1928 (45 Stat. L., 448)—An Act To establish the Bear River Migratory-Bird Refuge.

[SECTION 1]. That the Secretary of Agriculture is hereby authorized to construct, at Bear River Bay and vicinity, Utah, such dikes, ditches, spillways, buildings, and improvements as may be necessary, in his judgment, for the establishment of a suitable refuge and feeding and breeding grounds for migratory wild fowl; also to acquire, by purchase, gift, or lease, water rights and privately-owned lands, including the improvements thereon, deemed necessary by him for the purpose, or, in lieu of purchase, to compensate any owner for any damage sustained by reason of the submergence of his lands.

SEC. 2. That such lands, when acquired in accordance with the provisions of this Act, together with such lands of the United States as may be designated for the purpose by proclamations or Executive orders of the President, shall constitute the Bear River Migratory Bird Refuge and shall be maintained as a refuge and breeding place for migratory birds included in the terms of the convention between the United States and Great Britain for the protection of migratory birds, concluded August 16, 1916 [39 Stat. L., 1702].

SEC. 3. That no such area shall be acquired by the Secretary of Agriculture unless or until the Legislature of the State of Utah has consented to the acquisition of lands by the United States for use as a refuge for migratory wild fowl, and shall have provided for the use as a refuge for migratory wild fowl by the United States of any lands owned or controlled by the State in Bear River Bay, Utah, and vicinity, which the Secretary of Agriculture may deem necessary for such purpose, and which the Secretary of Agriculture is hereby authorized to accept on behalf of the United States; and, except in the case of a lease, no payments shall be made by the United States for any such area until title thereto is satisfactory to the Attorney General.

SEC. 4. That the existence of a right-of-way easement or other reservation or exception in respect of such area shall not be a bar to its acquisition (1) if the Secretary of Agriculture determines that any such reservation or exception will in no manner interfere with the use of the area for the purposes of this Act, or (2) if in the deed or other conveyance it is stipulated that any reservation or exception in respect of such area, in favor of the person from whom the United States receives title, shall be subject to regulations prescribed under authority of this Act.

SEC. 5. That no person shall take, injure, or disturb any bird, or nest or egg thereof, or injure or destroy any notice, signboard, fence, dike, ditch, dam, spillway, improvement, or other property of the United States on any area acquired or received under this Act, or remove therefrom or cut, burn, injure, or destroy any grass or other natural growth thereon, or

enter, use, or occupy the refuge for any purpose, except in accordance with regulations prescribed by the Secretary of Agriculture: *Provided*, That at no time shall less than 60 per centum of the total acreage of the said refuge be maintained as an inviolate sanctuary for such migratory birds.

SEC. 6. (a) Any employee of the Department of Agriculture authorized by the Secretary of Agriculture to enforce the provisions of this Act (1) shall have power, without warrant, to arrest any person committing in the presence of such employee a violation of this Act or of any regulation made pursuant thereto, and to take such person immediately for examination or trial before an officer or court of competent jurisdiction, and (2) shall have power to execute any warrant or other process issued by an officer or court of competent jurisdiction to enforce the provisions of this Act or regulations made pursuant thereto. Any judge of a court established under the laws of the United States, or any United States commissioner may, within his respective jurisdiction, upon proper oath or affirmation showing probable cause, issue warrants in all such cases.

(b) All birds or animals, or parts thereof, captured, injured, or killed, and all grass and other natural growths, and nests and eggs of birds removed contrary to the provisions of this Act or any regulation made pursuant thereto, shall, when found by such employee or by any marshal or deputy marshal, be summarily seized by him, and upon conviction of the offender or upon judgment of a court of the United States that the same were captured, killed, taken, or removed contrary to the provisions of this Act or of any regulation made pursuant thereto, shall be forfeited to the United States and disposed of as directed by the court having jurisdiction.

SEC. 7. That the Secretary of Agriculture is authorized to make such expenditures for construction, equipment, maintenance, repairs, and improvements, including necessary investigations, and expenditures for personal services and office expenses at the seat of government and elsewhere, and to employ such means as may be necessary to execute the functions imposed upon him by this Act and as may be provided for by Congress from time to time.

SEC. 8. That there is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, the sum of \$350,000, or so much thereof as may be necessary to effectuate the provisions of this Act: *Provided*, That not to exceed \$50,000 may be expended for the purchase of land, including improvements thereon.

SEC. 9. That any person who shall violate or fail to comply with any provision of, or any regulation made pursuant to, this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not more than \$500 or be imprisoned not more than six months, or both.

SEC. 10. That as used in this Act the term "person" includes an individual, partnership, association, or corporation.

1928—Joint Resolution of May 12, 1928 (45 Stat. L., 502)—
Joint Resolution To amend Section 10 of the Act entitled
"An Act to establish the Upper Mississippi River wild
life and fish refuge," approved June 7, 1924.

That section 10 of the Act entitled "An Act to establish the upper Mississippi River wild life and fish refuge," approved June 7, 1924 (Forty-third Statutes at Large, page 650), as amended by joint resolution of March 4, 1925 (Forty-third Statutes at Large, page 1354), be, and the same is hereby amended by substituting in lieu of the proviso therein contained the following: "*Provided*, That the Secretary of Agriculture shall not pay for any land or land and water a price which shall exceed an average cost of \$10 per acre: *Provided further*, That this provision shall not apply to any land or land and water heretofore acquired or contracted for under the provisions of this Act."

1928—Act of May 16, 1928 (45 Stat. L., 539, 558)—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1929, and for other purposes.

* * * *

BUREAU OF BIOLOGICAL SURVEY SALARIES AND GENERAL EXPENSES

For salaries and employment of labor in the city of Washington and elsewhere, furniture, supplies, including the purchase of bags, tags, and labels printed in the course of manufacture, traveling and all other expenses necessary in conducting investigations and carrying out the work of the bureau, as follows:

For necessary expenses for general administrative purposes, including the salary of chief of bureau and other personal services in the District of Columbia, \$68,500.

For the maintenance of the Montana National Bison Range and other reservations and for the maintenance of game introduced into suitable localities on public lands, under supervision of the Biological Survey, including construction of fencing, wardens' quarters, shelters for animals, landings, roads, trails, bridges, ditches, telephone lines, rockwork, bulkheads, and other improvements necessary for the economical administration and protection of the reservations, and for the enforcement of section 84 of the Act approved March 4, 1909, entitled "An Act to codify, revise, and amend the penal laws of the United States [35 Stat. L., 1088]," \$99,000, of which sum \$30,000 shall be available for increase of the water supply by the construction of a dam across Cold Springs Creek: *Provided*, That \$2,500 may be used for the purchase, capture, and transportation of game for national reservations.

For investigating the food habits of North American birds and other animals in relation to agriculture, horticulture, and forestry; for investigations, experiments, and demonstrations in connection with rearing fur-bearing animals; for experiments, demonstrations, and coöperation in destroying mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jack rabbits, and other animals injurious to agriculture, horticulture, forestry, animal husbandry, and wild game; and for the protection of stock and other domestic animals through the suppression of rabies in predatory wild animals, \$650,000, together with \$12,000 of the unexpended balance of the appropriation for this purpose for the fiscal year, 1927.

For biological investigations, including the relations, habits, geographic distribution, and migration of animals and plants, and the preparation of maps of the life zones, \$45,000.

For all necessary expenses for enforcing the provisions of the Migratory Bird Treaty Act of July 3, 1918 (Fortieth Statutes at Large, page 755), and for coöperation with local authorities in the protection of migratory birds, and for necessary investigations connected therewith, \$163,000: *Provided*, That of this sum not more than \$20,500 may be used for the enforcement of sections 241, 242, 243, and 244 of the Act approved March 4, 1909, entitled "An Act to codify, revise, and amend the penal laws of the United States," and for the enforcement of section 1 of the Act approved May 25, 1900, entitled "An Act to enlarge the powers of the Department of Agriculture, prohibit the transportation by interstate commerce of game killed in violation of local laws, and for other purposes [31 Stat. L., 187]," including all necessary investigations in connection therewith.

For investigations, experiments, and demonstrations for the welfare, improvement, and increase of the reindeer industry in Alaska, including the erection of necessary buildings and other structures and coöperation with the Bureau of Education, and for all expenses necessary for the enforcement of the provisions of the Alaska game law, approved January 3, 1925, \$100,000.

In all, salaries and expenses, \$1,125,500: *Provided*, That the Secretary of Agriculture shall investigate and report to the next regular session of Congress as to the feasibility of a five-year coöperative program, or a program extending over such term of years as to him shall seem most advisable for the purposes in view, for the eradication, suppression, or bringing under control of predatory animals within the United States, and the estimated cost thereof as compared to the present method.

UPPER MISSISSIPPI RIVER REFUGE

For the acquisition of areas of land or land and water pursuant to the Act entitled "An Act to establish the Upper Mississippi River Wild Life and Fish Refuge," approved June 7, 1924 [43 Stat. L., 650], and amendment thereto approved March 4, 1925 [43 Stat. L., 1313], and for all necessary expenses incident thereto, including the employment of persons and means in the city of Washington and elsewhere, \$1,000, which shall be available until expended, being part of the sum of \$1,500,000 authorized to be appropriated for such purpose by section 10 of said Act; and for all necessary expenses of the Secretary of Agriculture authorized by section 9 of said Act, \$39,000; in all, \$40,000: *Provided*, That the Secretary of Agriculture may incur obligations and enter into contracts for the acquisition of additional areas to an amount which, inclusive of the amounts heretofore and herein appropriated, shall not exceed a total of \$1,500,000, and such contracts shall be deemed contractual obligations of the Federal Government.

Total, Bureau of Biological Survey, \$1,165,000, of which amount not to exceed \$211,000 may be expended for departmental personal services in the District of Columbia.

1928—Act of May 22, 1928 (45 Stat. L., 699)—An Act To insure adequate supplies of timber and other forest products for the people of the United States, to promote the full use

for timber growing and other purposes of forest lands in the United States including farm wood lots and those abandoned areas not suitable for agricultural production, and to secure the correlation and the most economical conduct of forest research in the Department of Agriculture, through research in reforestation, timber growing, protection, utilization, forest economics, and related subjects, and for other purposes.

[SECTION 1]. That the Secretary of Agriculture is hereby authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary under sections 2 to 10, inclusive.

* * * *

Provided, That in carrying out the provisions of this Act the Secretary of Agriculture may cooperate with individuals and public and private agencies, organizations, and institutions.

* * * *

and receive money contributions from coöperators under such conditions as he may impose, such contributions to be covered into the Treasury as a special fund which is hereby appropriated and made available until expended as the Secretary of Agriculture may direct, for use in conducting the activities authorized by this Act, and in making refunds to contributors.

* * * *

Provided further, That the amounts specified in sections 2, 3, 4, 5, 6, 7, 8, and 10 of this Act are authorized to be appropriated up to and including the fiscal year 1938, and such annual appropriations as may thereafter be necessary to carry out the provisions of said sections are hereby authorized:

Provided further, That during any fiscal year the amounts specified in sections 3, 4, and 5 of this Act making provision for investigations of forest tree and wood diseases, forest insects, and forest wild life, respectively, may be exceeded to provide adequate funds for special research required to meet any serious public emergency relating to epidemics: *And provided further*, That the provisions of this Act shall be construed as supplementing all other Acts relating to the Department of Agriculture, and except as specifically provided shall not limit or repeal any existing legislation or authority.

* * * *

SEC. 5. That for such experiments and investigations as may be necessary in determining the life histories and habits of forest animals, birds, and wild life, whether injurious to forest growth or of value as supplemental resource, and in developing the best and most effective methods for their management and control at forest experiment stations, or elsewhere, there is hereby authorized to be appropriated annually, out of any money in the Treasury not otherwise appropriated, not more than \$150,000.

* * * *

1928—Act of May 29, 1928 (45 Stat. L., 883, 895)—An Act Making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1928, and prior fiscal years to provide supplemental appropriations for the fiscal years ending June 30, 1928, and June 30, 1929, and for other purposes.

* * * *

BUREAU OF BIOLOGICAL SURVEY

Bear River migratory-bird refuge: To enable the Secretary of Agriculture to carry into effect the provisions of the Act entitled "An Act to establish the Bear River migratory-bird refuge," approved April 23, 1928 [45 Stat. L., 448], fiscal years 1928 and 1929, \$200,000, of which amount not to exceed \$4,500 may be expended for personal services in the District of Columbia: *Provided*, That the Secretary of Agriculture may incur obligations and enter into contracts for the acquisition of lands to an amount which inclusive of amounts that may be expended hereunder, shall not exceed a total of \$50,000 and such contracts shall be deemed contractual obligations of the Federal Government.

APPENDIX 5

FINANCIAL STATEMENTS

EXPLANATORY NOTE

Statements showing appropriations, receipts, expenditures, and other financial data for a series of years constitute the most effective single means of exhibiting the growth and development of a service. Due to the fact that Congress has adopted no uniform plan of appropriations for the several services and that the latter employ no uniform plan in respect to the recording and reporting of their receipts and expenditures, it is impossible to present data of this character according to any standard scheme of presentation. In the case of some services the administrative reports contain tables showing financial conditions and operations of the service in considerable detail; in others financial data are almost wholly lacking. Careful study has in all cases been made of such data as are available, and the effort has been made to present the results in such a form as will exhibit the financial operations of the services in the most effective way that circumstances permit.

FINANCIAL STATEMENTS

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BUREAU OF BIOLOGICAL SURVEY APPROPRIATIONS AND EXPENDITURES, FISCAL YEARS 1886 TO 1928, INCLUSIVE

Fiscal year	Statutory roll		Lump fund		Bonus	Totals	
	Appropriated	Expended	Appropriated	Expended		Appropriated	Expended
1886.....	.....	.....	\$5,000.00	\$5,000.00	.....	\$5,000.00	\$5,000.00
1887.....	.....	.....	10,000.00	9,998.08	.....	10,000.00	9,998.08
1888.....	\$8,000.00	\$8,000.00	3,940.00	3,869.23	.....	12,000.00	11,920.23
1889.....	8,060.00	8,060.00	5,025.90	5,022.06	.....	13,085.90	13,082.06
1890.....	8,060.00	8,060.00	7,000.00	6,994.16	.....	15,060.00	15,054.16
1891.....	9,860.00	9,860.00	14,004.90	13,993.67	.....	23,864.90	23,863.67
1892.....	9,860.00	9,860.00	15,000.00	14,688.00	.....	24,860.00	24,548.00
1893.....	9,860.00	9,860.00	15,000.00	14,947.77	.....	24,860.00	24,807.77
1894.....	9,860.00	9,860.00	17,500.00	17,450.00	.....	27,360.00	27,310.00
1895.....	9,860.00	9,860.00	17,500.00	15,526.35	.....	27,360.00	25,386.35
1896.....	10,000.00	10,000.00	17,500.00	16,175.45	.....	27,500.00	26,235.45
1897.....	10,060.00	10,060.00	17,500.00	17,483.05	.....	27,560.00	27,543.05
1898.....	10,060.00	10,060.00	17,500.00	16,166.90	.....	27,560.00	26,226.90
1899.....	10,060.00	10,060.00	17,500.00	17,373.26	.....	27,560.00	27,433.26
1900.....	10,060.00	10,060.00	17,500.00	17,344.00	.....	27,560.00	27,404.00
1901.....	12,800.00	12,800.00	17,500.00	17,195.83	.....	30,300.00	29,995.83
1902.....	12,800.00	12,800.00	20,000.00	19,807.80	.....	32,800.00	32,607.80
1903.....	17,850.00	17,850.00	26,000.00	25,616.80	.....	43,850.00	43,416.41
1902-1903 ^a.....	.....	.....	2,000.00	1,949.61	.....	.....	.....
1904.....	17,850.00	17,850.00	34,000.00	33,006.92	.....	51,850.00	50,916.92
1905.....	17,850.00	17,497.08	33,000.00	32,937.79	.....	51,850.00	51,241.92
1904-1905 ^a.....	.....	.....	1,000.00	807.14	.....	.....	.....
1906.....	7,580.00	7,453.61	44,420.00	44,564.71	.....	52,000.00	51,518.32
1907.....	7,580.00	7,542.50	44,420.00	43,975.22	.....	52,000.00	51,517.72
1908.....	7,580.00	7,575.64	44,420.00	44,261.67	.....	52,000.00	51,837.31
1909.....	7,580.00	7,542.50	54,420.00	53,968.58	.....	62,000.00	61,511.08
1910.....	13,000.00	12,879.72	74,420.00	70,629.84	.....	87,420.00	83,509.56
1909-1912 ^b.....	.....	.....	59,700.00	59,596.68	.....	59,700.00	59,596.68

^a Transferring clk.

^b Purchase of land and establishment of National Bison Range.

THE BUREAU OF BIOLOGICAL SURVEY

APPROPRIATIONS AND EXPENDITURES, FISCAL YEARS 1886 TO 1928, INCLUSIVE—Continued

Fiscal year	Statutory roll		Lump fund		Bonus	Totals	
	Appropriated	Expended	Appropriated	Expended		Appropriated	Expended
1911.....	\$15,400.00	\$15,400.00	\$71,520.00	\$67,605.67	.....	\$86,920.00	\$83,095.67
1912.....	24,000.00	23,021.67	115,700.00	103,834.39	.....	139,700.00	127,456.06
1913.....	25,100.00	24,569.84	166,300.00	99,960.64	.....	191,400.00	124,559.48
1914.....	29,990.00	27,914.79	141,000.00	155,335.88	.....	170,900.00	183,250.67
1915.....	32,700.00	30,219.35	248,500.00	204,208.84	.....	281,200.00	294,438.19
1916 ^e	34,470.00	33,527.06	411,820.00	457,094.85	.....	521,200.00	499,621.91
1916 ^e.....	.....	.....	75,000.00	75,325.72	.....	.....	73,325.72
1917.....	44,030.00	41,932.07	534,200.00	548,427.61	.....	578,230.00	590,359.68
1918 ^d	46,370.00	46,188.66	545,700.00	526,092.71	\$6,416.75	609,736.75	636,355.85
1918 ^d.....	.....	.....	71,250.00	64,074.48	.....	.....	.....
1919.....	48,170.00	47,302.77	538,180.00	516,915.66	9,122.46	820,472.46	766,356.34
1919 ^e.....	.....	.....	225,000.00	202,137.91	.....	.....	.....
1920.....	55,970.00	62,405.99	686,200.00	685,994.51	30,641.15	809,082.35	783,771.70
1920 ^f.....	.....	.....	36,271.20	36,271.20	.....	.....	.....
1921.....	67,450.00	76,221.82	718,435.00	739,577.98	38,524.47	824,409.47	817,790.80
1922.....	81,070.00	93,510.91	742,255.00	754,331.15	40,373.56	863,698.56	847,842.06
1923.....	91,290.00	105,133.19	779,275.00	787,779.14	42,558.35	913,123.35	892,912.33
1924.....	94,790.00	106,153.85	777,475.00	786,638.06	43,740.35	916,005.35	886,791.91
1925.....	109,680.00	106,974.08	827,640.00	788,387.81	.....	959,540.00	913,690.54
1925 ^f.....	.....	.....	22,220.00	18,328.65	.....	.....	.....
1926.....	106,368.00	106,205.17	1,266,400.00	892,013.33	.....	1,372,768.00	998,218.50
1927.....	104,000.00	103,954.00	883,365.00	931,777.43	.....	987,305.00	1,035,731.43
1928.....	.....	.....	1,035,020.00	.....	.....	1,035,020.00	.....
Totals.....	\$1,257,188.00	\$1,208,806.27	\$11,562,497.00	\$10,123,248.00	1 \$211,377.09	\$13,031,062.09	\$11,422,054.27

^e Special appropriation for control of rabies.^d Allotment to Bureau from war appropriation for stimulating agriculture.^e Allotment to Bureau from war appropriation for stimulating agriculture.^f Deficiency appropriation for feeding starving elk in Jackson Hole region.^g Appropriation for protection of game in Alaska, transferred from Interior Department.^h Including \$400,000 for Upper Mississippi River Refuge, available until expended.ⁱ The amounts shown under the column headed "Bonus" are also included in the amounts expended under "Statutory Roll" and "Lump Fund," but not in the amounts shown as appropriated under these headings. The "Bonus" expenditures are included in the totals appropriated and expended.

MISCELLANEOUS RECEIPTS, FISCAL YEARS 1916 TO 1927, INCLUSIVE

Fiscal year	Govt. furs	Seized furs	Surplus property	Lost property	Damaged property	Rental Alaska, Is.	Grazing permits	Alaska game fees	Surplus animals	Total
1916.....	\$7,900.94	.....	.....	.....	.....	.....	.....	.....	.....	\$7,900.94
1917.....	35,908.19	.....	.....	.....	.....	.....	.....	.....	.....	35,908.19
1918.....	84,361.77	.....	36.40	.....	.....	.....	.....	.....	.....	84,398.17
1919.....	76,661.95	.....	301.15	.....	.....	.....	.....	.....	.....	76,963.10
1920.....	37,460.93	.....	1,431.39	262.75	100.36	.....	.....	.....	.....	39,255.43
1921.....	13,907.74	3,820.74	604.73	135.21	1.50	1,405.00	.....	.....	.....	19,674.92
1922.....	12,946.28	3,104.43	313.64	332.77	11.00	1,530.00	.....	.....	.....	18,238.12
1923.....	55,888.83	.....	786.65	411.44	87.65	1,780.00	164.65	.....	.....	59,113.22
1924.....	16,205.32	.....	606.22	281.87	26.00	1,580.00	.....	.....	.....	18,699.41
1925.....	20,756.71	.....	313.70	151.77	36.00	2,187.50	.....	2,905.00	.....	26,350.68
1926.....	17,901.40	.....	899.56	148.88	35.50	1,627.50	.....	11,334.15	.....	31,946.99
1927.....	28,052.42	.....	3,542.32	86.49	1.00	1,655.00	24.75	18,072.55	51,679.54	103,114.07
1928.....	27,836.43	.....	902.12	167.99	.....	1,788.25	326.00	33,405.91	10,739.07	75,165.77
Total	\$435,788.91	\$6,925.17	\$9,731.88	\$1,979.17	\$299.01	\$13,553.25	\$515.40	\$65,717.61	\$62,418.61	\$596,920.01

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APPROPRIATIONS AND EXPENDITURES, FISCAL YEARS 1886 TO 1928, INCLUSIVE,
AND RECEIPTS, FISCAL YEARS 1916 TO 1928, INCLUSIVE

Fiscal year	Appropriated	Expended	Receipts
1886.....	\$5,000.00	\$5,000.00	.....
1887.....	10,000.00	9,998.98	.....
1888.....	12,000.00	11,929.23	.....
1889.....	13,085.90	13,082.06	.....
1890.....	15,060.00	15,054.16	.....
1891.....	23,864.50	22,863.67	.....
1892.....	24,860.00	24,548.00	.....
1893.....	24,860.00	24,807.77	.....
1894.....	27,360.00	27,310.00	.....
1895.....	27,360.00	25,386.35	.....
1896.....	27,560.00	26,235.45	.....
1897.....	27,560.00	27,543.05	.....
1898.....	27,560.00	26,220.90	.....
1899.....	27,560.00	27,433.26	.....
1900.....	27,560.00	27,404.00	.....
1901.....	30,300.00	29,995.83	.....
1902.....	32,800.00	32,607.80	.....
1903.....	45,850.00	45,416.41	.....
1904.....	51,850.00	50,916.92	.....
1905.....	51,850.00	51,241.92	.....
1906.....	52,000.00	51,518.32	.....
1907.....	52,000.00	51,517.72	.....
1908.....	52,000.00	51,837.31	.....
1909.....	62,000.00	61,511.08	.....
1910.....	87,420.00	83,509.56	.....
1909 } ^a	50,700.00	50,596.68	.....
1910 }			
1911.....	86,920.00	83,095.67	.....
1912.....	139,700.00	127,456.06	.....
1913.....	191,400.00	124,559.48	.....
1914.....	170,990.00	183,250.67	.....
1915.....	281,290.00	294,428.19	.....
1916.....	521,290.00	563,947.63	\$7,900.94
1917.....	578,230.00	590,359.68	35,908.19
1918 ^b	669,736.75	636,355.85	84,398.17
1919 ^b	820,472.46	766,356.34	76,963.10
1920 ^b	809,082.35	783,771.70	39,255.43
1921 ^b	824,409.47	817,799.80	19,874.92
1922 ^b	863,698.56	847,842.06	18,238.12
1923 ^b	913,123.35	892,912.33	59,113.22
1924 ^b	916,005.35	886,791.91	18,699.41
1925.....	959,540.00	913,690.54	26,350.68
1926.....	1,372,768.00	998,218.50	31,946.99
1927.....	987,365.00	1,035,731.43	103,114.07
1928.....	1,035,020.00	.....	75,165.77
Totals	\$13,031,062.09	\$11,422,054.27	^c \$596,929.01

^a Special appropriation for establishing National Bison Range, Montana.^b Appropriations and expenditures for years 1918 to 1924, inclusive, included payments on account of salary bonuses.^c Of this amount, \$435,788.91 was from animal pelts; \$62,418.61 from big game animals; \$65,717.61 from Alaska game fees; \$13,553.25 from rentals of Alaskan islands; \$12,010.06 from property; \$6,925.17 from seized skins; and \$515.40 from grazing permits.

APPENDIX 6

MISCELLANEOUS STATISTICS

TOTAL PREDATORY ANIMALS KILLED BY FEDERAL AND COÖPERATIVE HUNTERS, 1915-1928

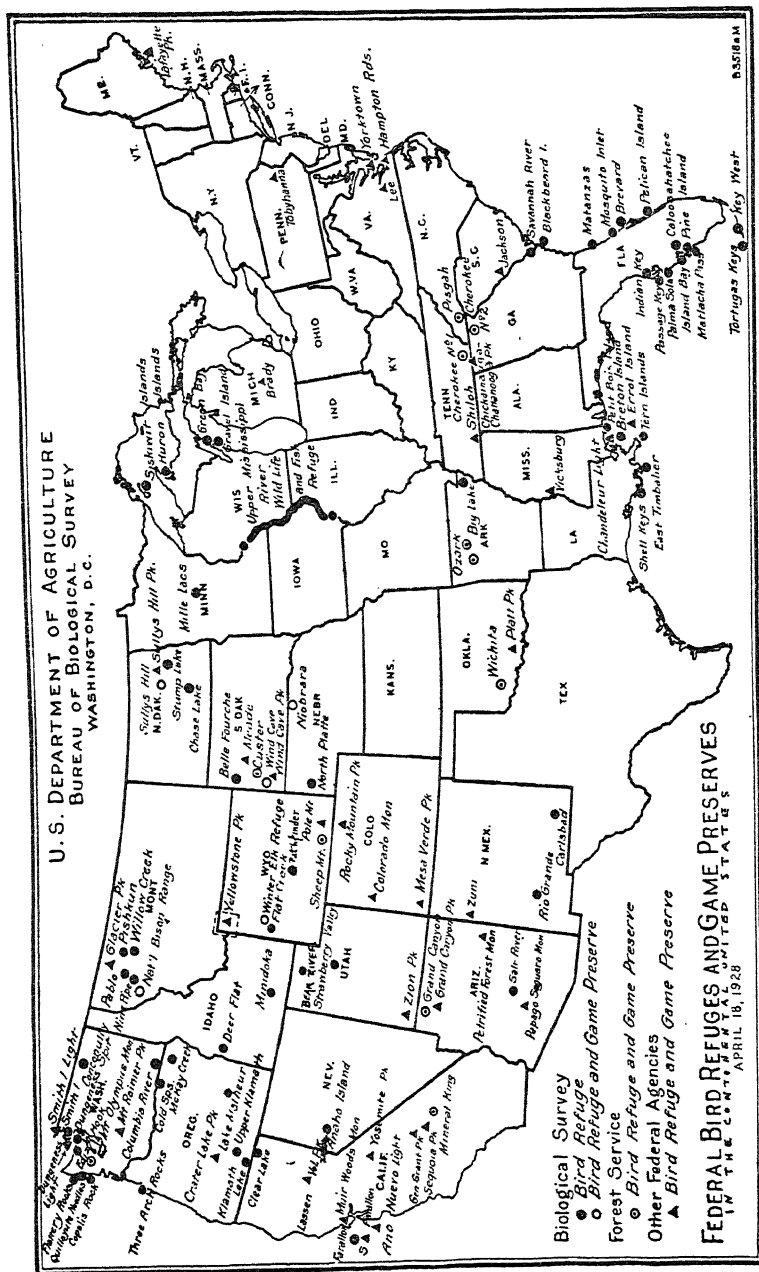
State	Bear	Bobcats, Lynxes	Coyotes ^a	Mt. Lions	Wolves ^a	Totals
Arizona	143	2,025	12,307	910	358	15,743
Arkansas .....	...	76	...	...	287	363
California	129	5,941	25,188	133	3	31,394
Colorado	114	1,401	19,065	90	174	20,844
Idaho	136	1,865	25,789	11	133	27,934
Illinois .....	...	...	10	...	18	28
Kansas .....	...	...	62	...	...	62
Michigan	34	193	1,337	...	276	1,840
Missouri .....	...	52	133	...	187	372
Montana	201	1,694	36,621	150	596	39,262
Nebraska .....	...	...	16	...	...	17
Nevada	4	9,940	60,762	41	6	70,753
New Mexico	188	2,582	16,644	460	602	20,476
North Dakota .....	...	10	655	...	1	666
Oklahoma .....	...	18	479	...	183	680
Oregon	264	4,654	36,476	89	31	41,514
South Dakota	1	338	9,495	...	53	9,887
Texas	1	3,896	23,252	21	3,153	30,323
Utah	59	4,301	33,125	131	188	37,804
Wyoming	156	1,582	37,422	18	707	39,885
Washington	173	1,236	28,143	42	2	29,596
Total	1,603	41,805	366,981	2,096	6,958	419,443

^a These figures are approximate only for wolves and coyotes, as many of these animals have unquestionably been killed with poison and never found.

COÖPERATIVE MONEY USED IN PREDATORY ANIMAL AND RODENT CONTROL WORK, FROM THE BEGINNING OF THE WORK THROUGH 1928

State	Rodent ^a	Predatory	Total
Arizona	\$600,233	\$153,336	\$753,569
Arkansas	7,172	4,848	12,020
California	3,666,796	367,372	4,034,168
Colorado	203,823	177,502	381,325
Eastern District	48,111	.....	48,111
Idaho	520,904	116,356	637,260
Illinois .....	.....	9,971	9,971
Kansas	75,939	.....	75,939
Michigan .....	.....	138,020	138,020
Missouri .....	.....	12,838	12,838
Montana	480,880	228,602	709,482
Nebraska	7,104	.....	7,104
Nevada	74,157	289,002	363,159
New Mexico	321,427	240,418	561,845
North Dakota	190,126	11,847	210,973
Oklahoma	22,671	1,403	24,074
Oregon	157,029	240,825	397,854
South Dakota	107,818	80,601	188,419
Texas	102,377	250,523	352,900
Utah	86,036	376,759	462,795
Washington	308,257	175,274	483,531
Wyoming	132,625	215,271	347,896
Total	\$7,121,585	\$3,090,768	\$10,212,353

^a Since the beginning of the rodent control work down to July 1, 1928, an approximate total of 166,006,564 acres has been treated in the several control areas throughout the country, chiefly, of course, in the Middle and Far West. Of this total state and private coöperating forces have taken care of 150,170,466 acres.



FEDERAL BIRD REFUGES AND GAME PRESERVES

DEPARTMENT OF AGRICULTURE

Designation	Acres	Chief species protected
<i>Biological Survey</i>		
Alabama:		
Petit Bois Island.....	635	Laughing gulls, least terns, black skimmers, Louisiana herons.
Alaska:		
Alaska Railroad .....	...	Muskrat and beaver.
Aleutian Islands .....	...	Puffins, auklets, murres, gulls, ducks, geese, ptarmigan, blue foxes.
Bering Sea .....	...	Puffins, auklets, kittiwakes, glaucous gulls, sandpipers, snow buntings.
Bogoslof .....	...	Sea lions, auklets, murres, gulls.
Chamisso Island .....	...	Horned puffins, Pallas murres, Pacific kittiwakes, glaucous gulls.
Curry .....	...	All birds, fish and game.
Forrester Island .....	...	Puffins, auklets, murrelets, murres, guillemots, gulls, petrels, cormorants.
Hazy Islands .....	...	Puffins, auklets, murres, guillemots, gulls, cormorants.
St. Lazaria .....	...	Puffins, auklets, murres, guillemots, gulls, petrels, cormorants.
Tuxedni .....	...	Various sea birds.
Arizona:		
Salt River	21,120	Cormorants, white pelicans, waterfowl.
Arkansas:		
Big Lake	7,774	Ducks of many species.
California:		
Clear Lake	33,840	Gulls, cormorants, ducks, geese, herons.
Farallon .....	...	Puffins, auklets, guillemots, murres, gulls, cormorants.
Florida:		
Brevard	12	Brown pelicans.
Caloosahatchee .....	...	Ducks, herons.
Indian Key	90	Pelicans, white ibises, egrets, Louisiana and little blue herons.
Island Bay .....	...	Brown pelicans, herons.
Key West .....	...	Cormorants, pelicans, man-o'-war birds, roseate spoon-bills, white ibises, herons.
Matanzas .....	...	Terns, shearwaters.
Matlacha Pass .....	...	Cormorants, pelicans, herons.
Mosquito Inlet .....	...	Least terns, pelicans, herons.
Palma Sola .....	...	Man-o'-war birds, herons.
Passage Key	5	Laughing gulls, terns, skimmers, cormorants, sandpipers.
Pelican Island	6	Brown pelicans.
Pine Island .....	...	Pelicans, herons.
Tortugas Keys	141	Sooty and noddy terns.
Georgia:		
Blackbeard Island	1,600	White-tailed deer, raccoons, opossums, herons, cranes.
Hawaii:		
Hawaiian Islands .....	...	Terns, albatrosses, shearwaters, petrels, gannets, man-o'-war birds, Laysan teal, rails, and finches.
Johnston Island .....	...	Sooty and noddy terns, shearwaters, petrels, boobies, man-o'-war birds.
Idaho:		
Deer Flat	12,300	Ducks, geese, pheasants.
Minidoka	13,240	Grebes, Forster terns, cormorants, ducks, coots, avocets, sage hens.
Illinois:		
Upper Mississippi River Wild Life and Fish Refuge (see Minnesota). ^a	...	
Iowa:		
Upper Mississippi River Wild Life and Fish Refuge (see Minnesota). ^a	...	

^a In process of establishment. Administered as to wild life and plants by Biological Survey; as to fish and aquatic life by Bureau of Fisheries.

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DEPARTMENT OF AGRICULTURE—*Continued*

Designation	Acres	Chief species protected
<i>Biological Survey</i>		
Louisiana:		
Breton Island .....	...	Laughing gulls, royal and Cabot terns, skimmers, herons, willets.
East Timbalier .....	...	Gulls, Royal terns, skimmers, pelicans, herons, clapper rails.
Shell Keys .....	...	Royal terns, brown pelicans, man-o'-war birds.
Tern Islands .....	...	Laughing gulls, royal, Cabot, and Forster terns, brown pelicans.
Michigan:		
Huron Islands	83	Herring gulls, ducks.
Siskiwit Islands	9	Do.
Minnesota:		
Mille Lacs	7	Gulls, ducks, geese.
Upper Mississippi River Wild Life and Fish Refuge (in the States of Illinois, Iowa, Minnesota, and Wisconsin). ^b	...	
Montana:		
National Bison Range.....	18,522	Buffalo, elk, deer, mountain sheep, grouse, pheasants.
Nine Pipe .....	...	Ducks, coots.
Pablo .....	...	Do.
Pishkun	3,160	Gulls, ducks, geese, swans.
Willow Creek	3,200	Ducks, geese.
Nebraska:		
Niobrara	16,125	Buffalo, elk, deer, antelope, prairie chickens, sharp-tailed grouse.
North Platte	5,107	Ducks, geese, swans, shorebirds.
Nevada:		
Anaho Island	248	Gulls, cormorants, white pelicans.
New Mexico:		
Carlsbad	18,680	Ducks, shorebirds.
Rio Grande	55,680	Grebes, cormorants, ducks, geese, shorebirds.
North Dakota:		
Chase Lake	2,839	Gulls, white pelicans, ducks, shorebirds, grouse.
Stump Lake	28	Western grebes, gulls, terns, ducks, Wilson phalaropes.
Sullys Hill National Game Preserve.	700	Buffalo, elk, deer, golden-eye and wood ducks, geese, pheasants.
Oregon:		
Cold Springs	2,520	Ducks, geese, swans, herons, sharp-tailed grouse.
Klamath Lake	81,619	Ducks, geese, coots, gulls, shorebirds.
Lake Malheur	88,960	Gulls, cormorants, pelicans, ducks, geese, swans, herons, avocets.
McKay Creek .....	...	Waterfowl.
Three Arch Rocks.....	...	Puffins, guillemots, murres, gulls, fork-tailed and Kaeding petrels, cormorants.
Upper Klamath .....	...	.....
Porto Rico:		
Culebra .....	...	Gulls, royal terns, Bahama ducks, herons, coots, ground doves.
Desecheo Island .....	...	Terns, boobies, gannets, man-o'-war birds, oyster-catchers.
South Carolina:		
Savannah River	2,350	Native birds.
South Dakota:		
Belle Fourche	13,680	Ducks, geese, curlews, prairie chickens, pheasants.
Wind Cave National Game Preserve.	4,160	Buffalo, elk, antelope, grouse, quail.
Utah:		
Bear River ^b	45,000	Migratory wild fowl.
Strawberry Valley	8,560	Ducks, sage hens.
Washington:		
Columbia River	8	Gulls, ducks, geese, herons.
Conconully	1,120	Ducks, sooty and sharp-tailed grouse, Hungarian partridges.
Copalis Rock	5	Puffins, murres, glaucous and western gulls, petrels, cormorants.

^b In process of establishment.

DEPARTMENT OF AGRICULTURE—*Continued*

Designation	Acres	Chief species protected
<i>Biological Survey</i>		
Dungeness Spit	227	Grebes, loons, gulls, ducks.
Ediz Hook	84	Pigeon guillemots, California murres, cormorants.
Flattery Rocks	68	Tufted puffins, pigeon guillemots, California murres.
Smith Island .....	...	Western grebes, pigeon guillemots, California murres, cormorants, ducks.
Quillayute Needles	117	Grebes, auklets, glaucous-winged and western gulls, cormorants, ducks.
Wisconsin:		
Gravel Island (Lake Michigan).	...	Herring gulls.
Green Bay .....	...	Do.
Upper Mississippi River Wild Life and Fish Refuge (see Minnesota). ^b	...	
Wyoming:		
Elk Refuge	2,760	Elk (in winter), ducks, geese, cage hens.
Flat Creek	40	Elk (in winter), ducks, geese.
Pathfinder	22,700	Migratory wild fowl.
<i>Forest Service</i> ^c		
Arizona:		
Grand Canyon Game Preserve.	886,208	Mule deer, Kaibale squirrels, dusky grouse.
Arkansas:		
Ozark National Game Refuges Nos. 1, 2, 3, and 4.	21,500	White-tailed deer, bobwhite quail, turkeys.
California:		
Sequoia Game Preserve.....	15,770	.....
Georgia:		
Cherokee National Game Refuge No. 2.	14,000	White-tailed deer, quail, turkeys.
North Carolina:		
Pisgah Game Preserve.....	77,045	Buffalo, elk, white-tailed deer, quail, turkeys.
Oklahoma:		
Wichita National Game Preserve.	57,120	Buffalo, elk, white-tailed deer, antelope, ducks, quail, turkeys.
South Dakota:		
Custer State Park Game Sanctuary.	44,360	Deer, Rocky Mountain goats, mountain sheep, elk, dusky and ruffed grouse.
Tennessee:		
Cherokee National Game Refuge No. 1.	30,000	White-tailed deer, quail, turkeys,
Washington:		
Mount Olympus National Monument.	299,370	Olympic elk, black-tailed deer, bears, grouse.
Wyoming:		
Medicine Bow	26,240	Elk, mule deer, grouse.

DEPARTMENT OF COMMERCE

Designation	Acres	Chief species protected
<i>Bureau of Fisheries</i> ^d		
Alaska:		
Afognak Forest and Fish Cultural Reserve.	512,000	Sea otters.
Pribilof Islands	49,000	Fur seals, sea lions, sea otters, puffins, auklets, murres, gulls, fulmars, cormorants, Pribilof sandpipers.
<i>Bureau of Lighthouses</i>		
California:		
Año Nuevo Island Lighthouse Reservation.	...	Sea lions.
South Farallon Island Lighthouse Reservation (see Navy Department).	120	Sea lions, puffins, auklets, guillemots, gulls, petrels, cormorants.

^c On all national monuments administered by the Forest Service birds and animals are also protected under national law, although they are not all strictly game preserves or bird refuges.

^d The Bureau of Fisheries also protects Curry Refuge, Alaska, as to the fish therein.

DEPARTMENT OF COMMERCE—*Continued*

Designation	Acres	Chief species protected
<i>Bureau of Lighthouses</i>		
Louisiana:		
Chandeleur Lighthouse Reservation.	5,000	Laughing gulls, terns, skimmers, pelicans.
Errol Island	340	Laughing gulls, terns, skimmers.
Washington:		
New Dungeness Lighthouse Reservation.	190	Grebes, loons, gulls, ducks.
Smith Island Lighthouse Reservation.	5,600	Grebes, puffins, murre, gulls, cormorants, geese, ducks.

DEPARTMENT OF THE INTERIOR

Designation	Acres	Chief species protected
<i>National Park Service *</i>		
Alaska:		
Katmai National Monument..	1,087,990	Brown bears, foxes, waterfowl.
Mount McKinley National Park.	1,692,800	Mountain sheep, caribou, moose, bears, grouse.
Arizona:		
Grand Canyon National Park..	645,760	Mountain sheep, mule deer, antelope, beavers, squirrels, dusky grouse.
Papago Saguaro National Monument.	1,940	Nongame birds.
Petrified Forest National Monument.	25,625	Do.
California:		
General Grant National Park.	2,536	Mule deer, quail, grouse.
Lassen Volcanic National Park.	79,360	Mule deer, bears, quail, grouse.
Muir Woods National Monument.	426	Deer, nongame birds.
Sequoia National Park.....	386,560	Deer, elk, bears, quail, grouse.
Yosemite National Park.....	719,802	Deer, bears, quail, grouse.
Colorado:		
Colorado National Monument..	13,883	Mule deer.
Mesa Verde National Park....	49,126	Elk, mule deer, bears.
Rocky Mountain National Park	241,739	Elk, mule deer, sheep, bears, beavers, sooty grouse.
Hawaii:		
Hawaii National Park.....	154,850	Hawaiian geese, nongame birds.
Idaho:		
Yellowstone National Park (see Montana and Wyoming).	23,040	
Maine:		
Lafayette National Park.....	7,680	White-tailed deer, beavers, ducks, geese, grouse.
Montana:		
Glacier National Park.....	981,681	Deer, elk, moose, sheep, bears, ducks, geese, grouse, ptarmigan.
Yellowstone National Park (see Idaho and Wyoming).	126,720	
North Dakota:		
Sullys Hill National Park.....	780	(See Sullys Hill National Game Preserve, administered by Bureau of Biological Survey, Department of Agriculture.)
Oklahoma:		
Platt National Park.....	848	Buffalo, elk, white-tailed deer.
Oregon:		
Crater Lake National Park.....	159,360	Black-tailed deer, elk, bears, grouse.

* Game and birds are protected by law on all national monuments administered by the National Park Service, whether they have been formally declared to be refuges or preserves or not. All the national parks are included in the above list except Hot Springs, which by reason of its character and environment is not suitable for a refuge.

DEPARTMENT OF THE INTERIOR—*Continued*

Designation	Acres	Chief species protected
<i>National Park Service</i>		
South Dakota:		
Wind Cave National Park.....	10,899	Grouse. (See also Wind Cave National Game Preserve, administered by Biological Survey.)
Utah:		
Zion National Park.....	76,800	Deer, grouse.
Washington:		
Mount Rainier National Park..	207,782	Black-tailed deer, Rocky Mountain goats, bears, grouse.
Wyoming:		
Yellowstone National Park (see Idaho and Montana).	1,992,960	Buffalo, Mountain sheep, antelope, mule deer, white-tailed deer, moose, bears, pelicans, ducks, geese, swans, dusky and ruffed grouse.

NAVY DEPARTMENT [†]

Designation	Acres	Chief species protected
California:		
South Farallon (see Department of Commerce, Bureau of Lighthouses).	10	Cormorants and sea birds.
Hawaii:		
Midway Islands .....	...	Albatrosses, Laysan rails, Laysan finches.
Virginia:		
Naval Operation Base (Hampton Roads).	945	Rabbits, quail.
Navy Mine Depot (Yorktown).	12,467	Rabbits, quail, turkeys.

WAR DEPARTMENT [‡]

Designation	Acres	Chief species protected
Georgia:		
Chickamauga and Chattanooga National Military Park (see Tennessee).	6,542	Rabbits, gray squirrels, quail.
Mississippi:		
Vicksburg National Military Park.	1,323	Squirrels, opossums, rabbits, raccoons, foxes, quail.
Tennessee:		
Chickamauga and Chattanooga National Military Park (see Georgia).	Roads only.	Rabbits, gray squirrels, quail.
Shiloh National Military Park..	3,546	Foxes, raccoons, opossums, squirrels, muskrats, weasels, skunks, minks.

[†] Birds are protected also at the naval ammunition depot, St. Juliens Creek, Virginia (221.6 acres), and at the Norfolk (Virginia) Navy Yard (361.6 acres), by order of the commandant, Fifth Naval District.

[‡] On three other national military parks also—Antietam Battlefield, Guilford Courthouse, and Gettysburg—and on national cemeteries birds receive protection. In addition it is to be noted that the national forest status given, so far as their actual or potential timbered sections is concerned, to several military reservations by executive orders authorized by Section 9 of the act of June 7, 1924 (43 Stat. L., 655), and the regulations promulgated for the administration of these military forests by the Departments of Agriculture and War, have made a number of army posts in various parts of the country bird refuges and game preserves to all intents and purposes. There were nineteen such areas on December 1, 1927, but an executive order issued on December 2, 1927, restored four of them (Forts Benning, Ga., and Eustis, Va., and Camp Meade, Md., and Pine Plains, N. Y.) to their original non-forest status, and of course automatically abrogated the regulations which had made them game and bird sanctuaries.

BIG-GAME ANIMALS ON RESERVATIONS OF THE BUREAU OF BIOLOGICAL SURVEY, JUNE 30, 1927

Area	Buffalo	Elk	Antelope	Mountain sheep	Deer		Total
					White-tailed	Mule	
National Bison Range, Montana.....	635	^a 308	...	67	^a 37	^a 149	1,186
Wind Cave Preserve, South Dakota...	158	^a 143	22	...	...	...	323
Sullys Hill Preserve, North Dakota...	16	^a 35	9	...	1	...	61
Niobrara Reservation, Nebraska.....	80	^a 100	10	...	1	...	191
Total	879	^a 586	41	67	^a 39	^a 149	1,761

^a Estimated.

APPENDIX 7

BIBLIOGRAPHY¹

EXPLANATORY NOTE

The bibliographies appended to the several monographs aim to list only those works which deal directly with the services to which they relate, their history, activities, organization, methods of business, problems, etc. They are intended primarily to meet the needs of those persons who desire to make a further study of the services from an administrative standpoint. They thus do not include the titles of publications of the services themselves except in so far as they treat of the services, their work and problems. Nor do they include books or articles dealing merely with technical features other than administrative of the work of the services. In a few cases explanatory notes have been appended where it was thought they would aid in making known the character or value of the publication to which they relate.

After the completion of the series, the bibliographies may be assembled and separately published as a bibliography of the Administrative Branch of the National Government.

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